CASSELL'S
PEOPLE'S PHYSICIAN

A BOOK OF MEDICINE
AND OF HEALTH
FOR EVERYBODY

IN FIVE VOLUMES

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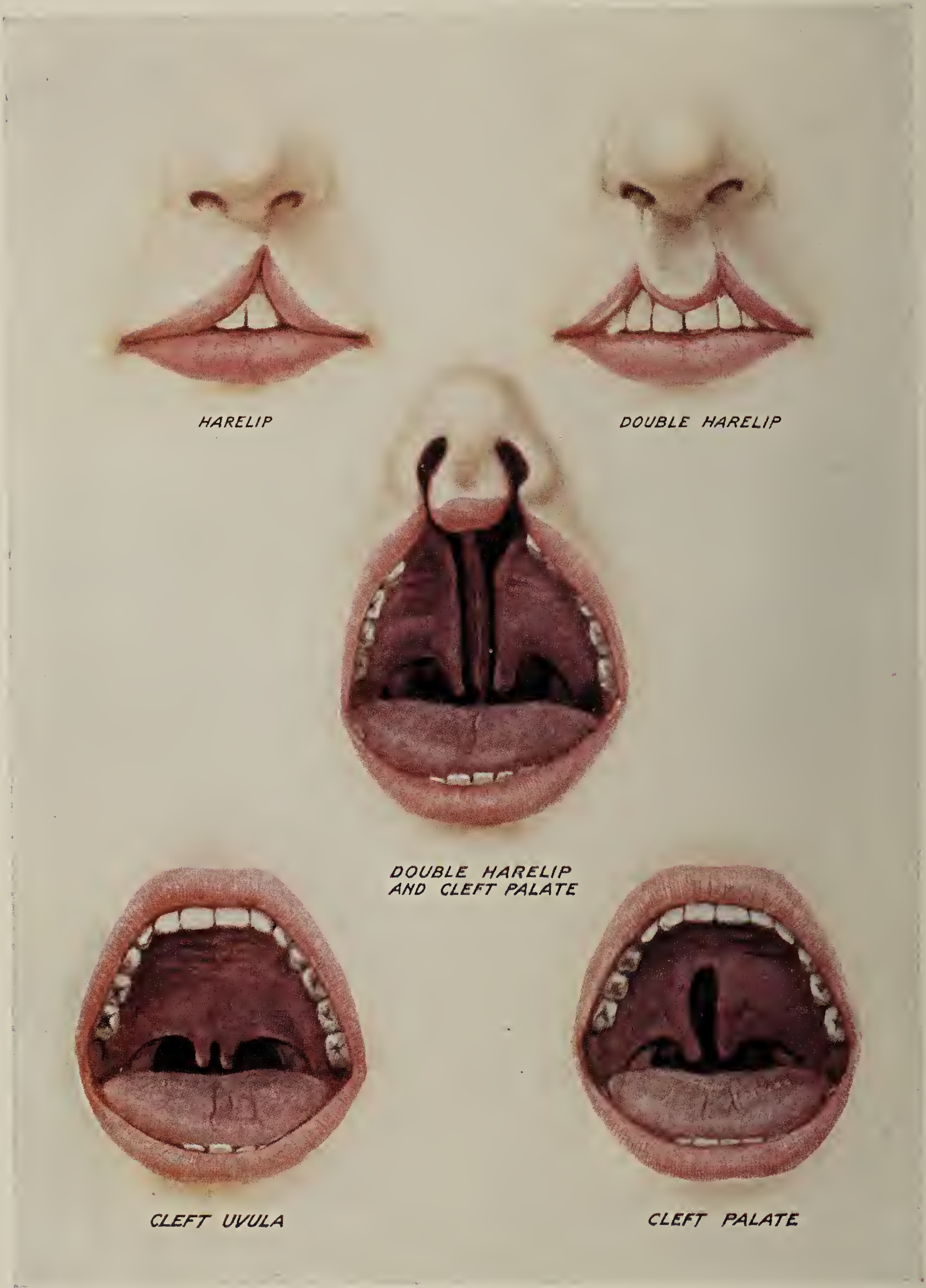

VARIETIES OF HARE-LIP AND CLEFT PALATE (*p.* 47).

I

Cassell's
People's Physician

A Book of Medicine and of Health for Everybody

Illustrated with Coloured and Black-and-White Plates
and with Figures in the Text

IN FIVE VOLUMES

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THE PEOPLE'S PHYSICIAN

PART II

DISEASES OF CHILDREN

CHAPTER XLV

DISORDERS OF INFANCY

Introductory—Disorders of Birth—Disorders of Nursing—Baby's Troubles—Mother's Troubles—Weaning—Vaccination—Teething—Congenital Disorders.

INTRODUCTORY

Health Peculiarities of Children.

IN the minds of many people children are taken to be little men and women, but this in many respects is a most inaccurate view, for children have many peculiarities which clearly distinguish them from men and women. If these are misunderstood or ignored the disorders of childhood will be difficult to understand, and the principles upon which their treatment depends will remain an unknown land. Children are in a state of active growth and development, and are accordingly liable to be severely affected by very slight causes. Their nervous systems in particular are excessively sensitive to external conditions, and many a slight local symptom acting through it may put the whole body out of gear. For instance an indigestible meal may give an adult an attack of abdominal pain with a furred tongue, but in a child it is far more likely to cause high fever with flushed face, hot skin, quick pulse, and very possibly an attack of convulsions. A trifling illness may in this way assume in a child a most serious aspect; and changes from health to disease occur with great rapidity. Children's disorders usually come on with great suddenness, the symptoms develop rapidly, and are intense in character; the attacks are short and sharp, and are followed by a quick recovery. The body, being in a state of rapid growth, is able speedily to repair the ravages of illness if it is not of too severe a form.

The nervous system at birth is much more developed relatively to other parts of the body than it is in an adult, and it has been estimated that the brain of a newly-born infant forms about 14 per cent. of its body weight, whilst in an adult it is only about 2⅓ per cent. But the brain matter is not so highly organised, and the general movements of the body are not so much under the control of the nervous centres. The actions of infants, such as sucking, crying, swallowing and breathing, are all involuntary, and are not under the direct influence of the brain, and we can thus explain their tendency to become disorderly and violent, as in an attack of convulsions.

The digestive organs of children also are much more active, more easily upset, and more important to the body generally than those of adults. In the latter they have simply to supply nourishment sufficient to maintain the body in health, and repair the loss caused by the wear of life, whilst in children they are also required to supply material for rapid growth and development. If in an adult the digestive organs break down and fail to perform their duties, the body, of course, suffers, but in a child the result is disastrous.

These considerations teach us how important it is to recognise any departure from health in children at as early a stage as possible, but a great difficulty at once arises in that a child may be too young to explain his symptoms and sensations, either from absence of speech or from want of knowledge. This difficulty can only be overcome by the most accurate observation of every trifling divergence from the ordinary course of a child's appearance, manner, and habits. A careful mother or an attentive nurse is quite capable of this, indeed is better able to do it than any stranger, however skilled or observant he may be; they soon learn to understand a child's ways, the meaning of little gestures, and the significance of its cry. They can tell if the latter means only temper or is caused by pain or an empty stomach.

In the study of disease we recognise three chief divisions of life, the first being that of growth and development, the second that of maturity, and the third that of decline. The first of these may be again divided into three periods. One is the time before the child is born, during which many diseases originate; these are called congenital diseases. Another is infancy, which, beginning at birth, terminates at the complete development of the first or milk teeth, that is at about the end of the second year. The third is childhood, which extends from this period to the development of puberty in the thirteenth to the fifteenth year.

The Three Periods of Development.

During the stage of development and growth the child is very helpless and dependent upon others; it is then that he requires so much attention and kindness, for without these it is more than likely either that he will never reach the stage of maturity, or that if he do so, it will be in a maimed condition, handicapped for the struggle of adult life.

Preventable Diseases.

It is during infancy that there is such an enormous number of deaths from preventable disorders. In this country out of every thousand children born, about 145 perish within the first year of life. Now it is estimated that not more than eighty, at the outside, should succumb during the first twelve months to what may be regarded as unavoidable causes. This means that the lives of upwards of 50,000 infants every year are lost as the result of diseases which, with care, might have been avoided. The majority of these sacrificed lives are lost through disorders of the digestive organs, chiefly as the result of improper feeding. The mortality of infants is appreciably diminishing, and there is little doubt will continue to do so as the knowledge of infant management, especially in connection with diet, becomes more general. In some towns charitable persons have set themselves to teach poor and ignorant mothers the simple rules of health, and the result has been most encouraging. The importance of diet in the treatment of children's disorders can hardly be overestimated, for nothing so influences the rate of recovery as a judicious selection of suitable articles of food. In feverish diseases the digestion is much impaired, and there is much difficulty in supplying sufficient nourishment to maintain the strength and weight. It is necessary to select the lightest and most digestible of food, and it is wonderful how rapidly improvement takes place in a sick child, especially one suffering from digestive disturbance, when the diet is reduced in quantity and limited strictly to articles which are adapted to his enfeebled powers. Exhaustion is very rapidly produced in children by acute illness, and there is no doubt that when such appears the most useful medicines to employ are alcoholic stimulants. They should be given most judiciously, the doses consisting of drops, and their effect should be assiduously watched; carefully administered, there is no doubt that many a life may be saved by their employment.

The digestion must be first considered before administering medicines to children, for there is nothing gained by giving them tonics and cod liver oil while their digestive organs are too upset to assimilate such things.

Children and Medicines.

There is a peculiar tolerance in children for certain medicines which it is difficult to explain. They can take unexpectedly large doses of calomel, belladonna, henbane and arsenic. Of the last-named children of five will tolerate as large doses as an adult, and it is stated that girls often require more than boys. Antipyrin, quinine, and iodide of potash, are also well borne, and ergot, so commonly given for chorea (St. Vitus's dance), may be given in large doses. On the other hand children are exceedingly susceptible to opium and morphia, and when these medicines are used they must be prescribed in very small doses. Narcotic drugs are sometimes given to children in the form of "soothing syrups," and the practice has been employed by unscrupulous nurses to keep children quiet and save themselves from trouble. The symptoms thus produced are a drowsy condition, very small pupils, vomiting, constipation, scanty urine, and an inelastic condition of the skin. Such a combination of symptoms should arouse grave suspicions. Medicines should, as far as possible, be avoided in the treatment of infantile complaints, and many a child may, by careful management and appropriate food, pass through the years of infancy without any necessity arising for medicines.

The following table is given as a guide to the dose of medicines suitable for different ages compared with that prescribed for an adult.

GAUBIUS' TABLE

For an adult, suppose the dose to be .	1	or	60	grains
Children under 1 year will require .	$\frac{1}{12}$	,,	5	,,
,, ,, 2 years ,, ,, .	$\frac{1}{8}$	,,	7½	,,
,, ,, 3 ,, ,, ,, .	$\frac{1}{6}$	,,	10	,,
,, ,, 4 ,, ,, ,, .	$\frac{1}{4}$	,,	15	,,
,, ,, 7 ,, ,, ,, .	$\frac{1}{3}$	,,	20	,,
,, ,, 14 ,, ,, ,, .	$\frac{1}{2}$	,,	30	,,
,, ,, 20 ,, ,, ,, .	$\frac{2}{3}$	,,	40	,,
From 21 to 60, the full dose . . .	1	,,	60	,,

Above this age an inverse gradation must be observed.

DISORDERS OF BIRTH

Deformities of the Head.

During the process of birth the infant's head becomes much altered in shape to accommodate it to the limited space through which it has to pass. The various bones of which the skull is formed are not firmly connected together as in the adult, but have margins of soft material which allow them to overlap one another. In two spots in the middle line of the skull, at which several bones meet, there are particularly soft areas, called the fontanelles. If the finger be placed over the large front one, which is situated above the centre of the forehead, the brain can be felt distinctly to pulsate with each beat of the heart ; it is found also to protrude when the child cries or otherwise exerts himself; and from its condition much may be learnt in connection with disease. In a healthy child the opening is level with the bones of the skull, or very slightly depressed, but in states of exhaustion, however produced, whether by malnutrition, disease or want of food, it becomes depressed and provides a very definite indication for the necessity of stimulation and nourishment. The fontanelle is often seen to be greatly depressed in the extreme malnutrition caused by chronic gastric catarrh. On the other hand, bulging of the fontanelle is a usual symptom of slowly progressive water on the brain (chronic hydrocephalus). The proper time for this opening to close is from the fifteenth to the twentieth month of infant life, and if its closure is much delayed it will probably be found that the child is suffering from rickets, for in this disease the closure may be postponed to the third year or even later. Water on the brain also delays its closure, and this spot is often chosen by the surgeon to draw off some of the water through a hollow needle.

As a rule the deformity of the skull caused by birth rapidly disappears, and the head develops its natural appearance. There are, however, other deformities of the head, caused by swelling of the soft parts. A large lump may form from blood having been poured out beneath the skin ; this goes by the name of the " caput succedaneum." It is usually situated on the right side of the head, is simply the result of pressure, and disappears in the course of a few days, causing no trouble.

Another not uncommon condition is a blood tumour of the neck caused by injury occurring at birth. It is especially frequent when the infant comes into the world feet first, and has been proved to be caused by a collection of blood in the muscles. It may take months before it entirely disappears, but no special treatment need be adopted.

Birth Paralysis.

Birth paralysis sometimes follows tedious confinements, which have necessitated the use of instruments to assist birth. It most often is met with in the face, and is the result of pressure on the nerve. It need cause no anxiety, for it will gradually disappear by itself, although it takes many days or even some weeks in subsiding. When the paralysis affects the arm, which is more rare, it is also more serious, and requires complete rest of the limb, which should be wrapped up in cotton wool and bandaged to the side.

Premature Children.

A child born before its time is very difficult to rear, and is the cause of great trouble to both its mother and its nurse. A premature infant is much smaller than one born at full time. The average weight of a child at birth is about 7 lb. for girls, and 7½ lb. for boys, but premature infants born at the seventh or eighth month may weigh only 3½ lb. or 4 lb. There is very little hair on their heads, and their nails are soft and imperfectly formed. The first point of difference between them and properly developed infants is that they are excessively sensitive to cold, and the utmost care is necessary to maintain their body heat. In lying-in hospitals they would be placed in an incubator, which consists of a glass box, in which the temperature is maintained by a special arrangement of hot-water pipes. In a private house, although an incubator can be obtained, it is very difficult to manage, for it requires constant attention, and any neglect may mean the infant's death.

Premature infants require very special treatment, and cannot be washed and dressed like other children. They should be put at once in a bath of hot water, the temperature of which should be above 100°. They must be washed quickly, wrapped up in a warm flannel, and dried without being uncovered. They should be smeared over with grease, wrapped up in a thick layer of cotton wadding, the diaper being put on without exposing them, and laid in a cradle well warmed with hot bottles, which are separated from the child's body by a thick layer of blanket. The room must be kept at a temperature of 65°, and every care taken to avoid draughts and cold air. The diapers should be changed as seldom as possible, and the child should not be taken out of its cradle to be nursed. Such infants are usually too weak to suck, so that it is necessary to give all food with a spoon. The best nourishment is the mother's milk, which should be drawn off from the breast with a pump; if this cannot be obtained cow's milk may be given diluted with three times as much weak barley water. Sometimes it is found necessary to pour the food into the stomach through a tube passed down the gullet, and brandy may often be added to the food, a few drops at a time. After from six weeks to two months this extreme degree of care may usually be relaxed, but for months the child will require great attention, and for years will be less advanced than others of the same age.

Absence of Breathing.

Immediately an infant is born it makes active movements to fill its lungs with air, and it is one of the first duties of the nurse to see that the air passages are cleared of all fluid, for if this be not done it may be drawn by the efforts of breathing into the windpipe and cause suffocation. The mouth and throat should be wiped clean with a pledget of cotton wool, wetted with weak boracic acid lotion.

If the breathing is still delayed, more active measures will be required. The infant should be plunged into hot water, and then removed, and have cold water dashed over it with a sponge or with the hand. The whole body should next be slapped with the corner of a wetted towel. These measures seldom fail to produce respiratory movements. This trouble is most frequent in premature babies, whose hold on life is very precarious. They should be wrapped up in cotton-wool and a flannel and laid near to a fire, and constant attention should be paid to them for fear of the breathing again becoming impeded. Artificial respiration is sometimes needed in these cases, the sides of the chest being forcibly pressed with the hands, and relaxed about twenty times a minute.

Jaundice.

Infants a few days after birth may be affected with jaundice. The skin becomes yellow, the colour being first noticed on the face around the mouth, then on the chest, stomach and limbs. The whites of the eyes also may be tinged, the urine grows dark in colour, and stains the napkins, and the motions may become light, though in the majority of cases they are of quite a natural colour. Apart from these symptoms the child seems perfectly happy, and well. The disorder is quite harmless, and need cause no anxiety. It disappears spontaneously in the course of a few days. The treatment consists in attending to the child's general health, and regulating the bowels with occasional ½-grain doses of mercury and chalk powder. The body should be kept warm, and if the child is being bottle-fed the richness and strength of the food should be somewhat reduced for a few days.

Bleeding.

It is not an uncommon thing for an infant to bring up blood from the stomach or pass it in the motions. The blood may be derived from a sore on its mother's nipple, from which it is drawn in the process of sucking, or it may come from a sore of the child's mouth or nose. It then collects in the stomach, and is ejected occasionally in large quantities by vomiting. In rarer and far more serious cases a bleeding sore exists in the stomach, or some impediment to the circulation through the liver causes oozing of blood from the lining of the stomach and bowels. Sometimes the condition called hæmophilia (Vol. I., p. 48) is present in infants, and explains the bleeding. In serious cases the attack usually comes on in the first twenty-four hours of life, may set up convulsions, and may end in death from exhaustion. In less important cases no treatment is required apart from that necessary to heal the sore spot, but in graver cases it is necessary that the hæmorrhage be checked as quickly as possible. Tannin, $\frac{1}{4}$ grain in a teaspoonful of syrup of krameria, may be tried, or ergotine, $\frac{1}{4}$ to $\frac{1}{2}$ grain in a teaspoonful of syrup, given every two or three hours, until there is reason to believe that the bleeding has ceased.

Disorders of the Navel.

If the umbilical cord is properly treated at the time of birth and kept clean with antiseptics until it has separated, no troubles occur. It should be tied with a fairly thick thread which has been allowed to soak in some antiseptic lotion, and the stump left attached to the child after it is divided should be well washed. It must then be carefully dried, dusted with oxide of zinc or boracic acid powder, passed through a slit in a piece of old clean linen, turned upwards and wrapped up in the linen. In ordinary circumstances it shrivels up and separates in a short time, varying from the third to the seventh day after birth. The period depends chiefly upon the thickness of the cord; the thicker it is, the longer it takes to separate. The sore place left when it drops off, gradually heals, and becomes quite dry and free from discharge by about the tenth or twelfth day. Occasionally it is sluggish in healing, " proud flesh " forms on it, and it may be necessary to use some astringent lotion such as the " red wash." On the sore a small red projection sometimes forms which is called " fungus of the navel," and may remain for weeks, causing a discharge and irritating the surrounding skin. It should be rubbed with a stick of lunar caustic, and covered with oxide of zinc powder.

Bleeding from the navel is rare and is usually the result of want of cleanliness and blood poisoning. It may also occur from inherited syphilis and in hæmophilia. It should be stopped by powdering with oxide of zinc and placing a pad of lint under the binder, the latter being applied rather tightly.

Occasionally a distinct weakness of the abdominal wall is left after the cord has separated, and whenever the child coughs or cries there is a bulging at the spot. This may grow larger and a portion of bowel may protrude into it, forming a rupture. It must be treated by carefully applied pressure. The swelling should be pushed back with the finger whilst the child is quiet, and a small pad of lint or linen in which is wrapped a piece of cork about the size of a threepenny bit should be applied and fixed in position by a piece of strapping. This should be worn for some weeks, and not taken off except to apply a fresh one, until the spot has become quite strong again.

Ophthalmia Neonatorum.

Occasionally an inflammation of the eyes of new-born children is set up by the entrance into the eyes of discharges at the time of birth. The great majority of cases might be prevented altogether by the mother using antiseptic douches to cure all discharges before her confinement, and by careful cleansing of the child's eyes immediately it is born. The symptoms show themselves from three to five days after birth, usually in both eyes. A slight discharge is seen to collect in the corners of the eyes, which rapidly becomes profuse. The entire surface of the eyes becomes red and swollen, the lids also are affected, and the whole of the inflamed surface is bathed with a thick mattery fluid. If neglected the cornea becomes opaque and ulcerated, a hole may form in it through which the fluids of the eye escape, causing a shrinking of the eyeball and complete loss of sight. The treatment, at first preventive, should be commenced by the nurse or doctor at the moment of the child's birth, the eyelids, immediately the child's head comes into the world, being thoroughly washed with a piece of wool soaked in an antiseptic lotion. Whatever lotion is being used to disinfect the hands is suitable for the purpose; a 1 in 1,000 solution of either perchloride or biniodide of mercury can be recommended. This is made by dissolving one of the tabloids of these drugs in 1 pint of warm water. Such routine treatment is usually quite sufficient, but it is of the utmost importance for the nurse to wash the eyes daily with a weak boracic acid lotion (5 grains to 1 ounce of water), and to keep a careful watch on the eyes, so that more active treatment may be begun as soon as anything is noticed to be wrong with them, for the complaint is so often overlooked or treated as unimportant. If any mattery discharge appears it should be thoroughly and frequently washed away with warm boracic lotion, which should be allowed to run into the eyes under the lids. If, however, the lids grow red and swollen, and the discharge thick and copious, the case is really unsuitable for domestic treatment, and should be placed in the hands of a doctor without delay, for it will require the energetic and difficult treatment recommended for purulent ophthalmia (Vol. II., p. 55). The child will require all the nourishment he can digest to maintain his strength through the ordeal, and no food can compare with the mother's milk. It is necessary that those who carry out the treatment should realise the danger to themselves through contamination of the eyes with the discharge carried on the fingers.

DISORDERS OF NURSING

Although the process of nursing or suckling may be carried through in a healthy infant without a single hitch or hindrance, yet it is very common for certain difficulties to be met with, and for frequent troubles to arise which may affect either mother or child. There is no doubt that the best of all foods for an infant is that provided by nature, and that with the various exceptions to which we shall refer, the mother's milk should be the baby's food. If the mother is strong and in sound health she will be able to supply an ample amount for the child's requirements for the first few months of its existence.

Here the first difficulty meets us, for it is not every mother who is in sound health, or if she is apparently healthy in every other respect she may be wanting in this one particular, and be quite incapable of providing sufficient milk to nourish her infant. There seems little doubt that life in towns, and especially the life led in "Society," renders many a mother deficient in the power of nursing, even though she may do her best and relinquish every other duty for the purpose.

No woman who may have a strong hereditary taint of disease, especially of tubercular disease, should attempt to suckle her child, and those who are delicate or ill-developed will find the drain on their powers greater than they can bear, for this complicated and nutritious fluid is only produced with considerable expenditure of strength. For this reason a mother who is suffering from extreme anæmia or general debility will probably find her attempts at nursing a failure. Any severe feverish disease such as typhoid fever or pneumonia renders nursing also quite out of the question.

However, in most cases an attempt should be made to feed the child from the breast for at any rate the first few weeks. The carrying out of this natural process is advantageous both to the mother and to the infant. The mere act of suckling has a powerful indirect action on the womb; it aids the natural changes which take place in the womb for some weeks after birth, by which it gradually returns to its normal condition. Every time the child is put to the breast the womb is stimulated to contraction, and its size and blood supply are reduced. This effect is plainly shown by the almost constant occurrence of the "after pains," as they are called, which occur during suckling in the first few days, and are caused by muscular contractions of the womb. The mother may also be saved from many troubles in connection with the breasts if the milk is thus drawn off at regular intervals; the breasts are less tender, and the danger of their becoming inflamed and developing abscess is much reduced.

Benefit of Suckling to the Mother.

When possible the mother should take plenty of healthy exercise in the open air, but she must avoid overheated places of amusement, and irregular or late hours, and as far as possible all causes of nervous exhaustion, such as excitement or worry, for the character of her milk is much altered by her mental condition, which should if possible be placid, serene, and uniform.

BABY'S TROUBLES

A few hours after birth, when the mother has had a good sleep, the infant should be put to the breast, for though there will be no food for it, its sucking will help to draw out the nipples, and through the nervous system will aid in contracting the womb. For the first day or two no milk is obtained, but a thin watery fluid which is called colostrum. This acts as an aperient and thoroughly clears the infant's bowels of the black material (meconium) which has collected there in large quantity. No messes, such as butter or sugar, should be given to the child to conform with old-fashioned customs, nor is even castor oil needed in most cases. If the infant seems to be really hungry before its natural food is ready, a little milk and water sweetened with white sugar may be given, but this is seldom necessary.

Trouble may now begin for the baby, for it may be unable to suck. This may be due to malformation, such as tongue-tie, cleft palate, hare-lip, or blocking of the nostrils, the treatment of which is described elsewhere, or it may be because it cannot get hold of the nipples. Occasionally the nipples may be so small that the infant cannot take them into its mouth. A careful mother should have previously prepared them by repeatedly drawing them out and protecting them from pressure. They may be made more prominent by the regular use of a breast pump.

Digestive Disturbance.

Infants are very liable to attacks of digestive disturbance, shown by diarrhœa, stomachache, and vomiting. These affect the breast-fed, but are far more common in those brought up on the bottle. They may be caused by something amiss with the mother; she may have indulged in unsuitable food or drink, may have taken medicine which has got into the milk, may be constipated, feverish, or otherwise out of health. With bottle-fed babies the food may be at fault in many ways. It may be given either too hot or too cold, instead of at body heat; it may be given in too large quantities; it may contain unsuitable ingredients, the most common being starch not prepared for infant food; or it may be given too frequently and irregularly. The last is perhaps the most common cause of trouble. It is a frequent habit amongst ignorant mothers directly the child cries to stop its mouth promptly with the nipple or teat, and stuff its stomach. This may for a time give relief, for the warm fluid is soothing to an irritable and disturbed stomach, but the trouble soon returns, only to be checked in the same injudicious manner. The proper treatment for a disturbed and over-worked stomach is not to give it more work to do, but to give it a rest, and many a crying baby may be made a happy one by lessening its feeds, and even omitting one meal altogether. It is often wise to dilute the food more than usual for a few feeds, until the symptoms subside.

It should be well understood how unsuitable starch of all kinds is in an infant's diet. The saliva does not possess the power of digesting it until the child reaches the age of six months or thereabouts, and if it is taken in at all large quantity it is sure to set up irritation and flatulence, and cause much trouble. Arrowroot, flour "pap" and such foods are therefore quite inadmissible, but the starchy "infant's foods" which are used so generally are suitable, as they have previously been prepared by being malted or predigested.

Another fruitful cause of trouble with bottle-fed infants is want of cleanliness in the bottle and its tube or the jugs in which the milk is kept. The smallest quantity of milk which has been allowed to go sour will spoil all the food with which it is mixed. A common source of souring of milk is the long tube which is attached to one form of feeding bottle; this is very difficult to clean and should never be used. The right form to adopt is the boat-shaped bottle upon the end of which the teat can be fixed, as this can be cleaned with the greatest ease.

It is a great mistake to conclude that "crying babies" are always hungry babies, and a good and intelligent nurse will soon find this out. The child may have lain too long in one position, and have got cramped, and all it wants is to be turned over in its cot. It may have too tight a binder, or a pin may be sticking into it, or it may feel too hot or too cold, and may want to be made comfortable. Or it may have the stomach-ache, caused by wind in the bowels, and a little dill-water mixed with hot water will soon disperse the wind and put it to rights.

MOTHER'S TROUBLES

Deficient Secretion of Milk.

When the milk is deficient in quantity its secretion may be encouraged in various ways. Warm fomentations to the breasts have a beneficial effect. The mother's health should receive attention, the bowels should be kept freely open, and the diet should be carefully supervised. She should take plenty of nourishing fluids such as milk and gruel; stout also is useful, but not so much so as milk. A cupful of warm milk, gruel, or cocoa taken about half an hour before feeding the baby often produces for it a more abundant meal. The diet should be a mixed one, and contain a fair proportion of animal food, but should not be very rich, and fatty foods should be taken with moderation. At the same time anything likely to upset the baby, such as pickles, acid drinks, highly seasoned dishes, pastry, raw vegetables and fruit, must be avoided. It is well to remember also that many drugs taken by the mother, such as morphia, Epsom salts, and other aperients, are transferred to the child in the milk.

In some cases, especially at the commencement of suckling, there is an excessive flow of milk, far more than the child can make use of;

it then runs away, wetting the night-dress and even the bedclothes, and causes much discomfort. To lessen this trouble the diet should be altered—the solids should be increased in amount, and the fluids reduced. A good plan will be to draw off some of the milk with a pump or press it out with the fingers, before putting the child to the breast; the infant should be given the milk last secreted, as it is more nutritious than that first formed.

Excessive Secretion of Milk.

Sometimes, shortly after the flow of milk is established, the mother suffers from feverishness, accompanied by a good deal of constitutional disturbance. This is milk-fever, and is in some cases the result of the child not being put to the breast sufficiently early, and of these organs becoming distended with their secretion. It may also be caused by insufficient food, and was far more common in the days when every woman after confinement was treated on the starving plan, and was given nothing but weak gruel, and very little of that. It should be met by nutritious diet, careful emptying of the breasts at regular intervals, and clearing of the bowels by simple aperients. It is not as a rule a serious trouble, and soon passes off when the nursing is carried out with regularity.

Milk-Fever.

One of the most troublesome complications of nursing is cracked or sore nipples. It is unfortunately very common, and yet so painful that it makes every application of the child to the breast a matter of dread, and so upsets the mother's nervous system in some cases as to disturb the proper supply of milk This trouble should be guarded against by care and attention paid to the nipples before the birth of the child. For two months previously the nipples should be bathed night and morning with some astringent lotion, such as 10 grains of tannin in 1 ounce of rose-water, or equal parts of eau-de-Cologne, brandy, or other spirit, and glycerine. During nursing the nipples should be carefully washed and dried immediately after the child is removed, and if there is any tendency to soreness the astringent applications should be continued.

Cracked Nipples.

When the sore has formed these lotions are too strong and painful for regular use, and nothing is better than a strong infusion of tea, but if this is without effect the stronger applications must be tried. It is important to wash them off gently before the infant is put to the breast. For a few days the nipple may be guarded by a nipple shield. These are useful both to protect the nipple from the pressure of the clothing, and, if perforated, to keep it from injury in the child's violent efforts of sucking. A powder formed of equal parts of oxide of zinc and starch is useful to keep the nipples dry. If the pain is very severe and persistent, it may be necessary to touch the crack with a stick of lunar caustic. It is not at all unusual for this trouble to check, and even end, an otherwise perfectly satisfactory course of suckling. Unless the cracks are healed at once they may lead to the formation of the far more serious affection of abscess of the breast.

Abscesses of the Breast.

During nursing the greatest care should be taken to prevent the formation of hard lumps in the breast; these are very liable to appear, and should be treated at once. The child's visits should be very regular, and the milk should not be allowed to accumulate in the breast for any length of time. Gentle rubbing of the swelling towards the nipple with the fingers moistened with oil or with belladonna liniment is soothing. If inflammation is set up in these lumps matter is very likely to form, and much trouble is the consequence. Abscess may be caused by carelessness in these matters, by exposure to cold, or by the spread of inflammation from cracked or sore nipples. The symptoms of abscess are a severe throbbing pain in the breast, a tender lump which grows gradually larger, and fever which is sometimes quite severe and may be accompanied by a rigor or shivering fit. Unless the inflammation is checked it proceeds to the formation of matter which will either burst through the skin, leaving a ragged hole and subsequently a bad scar, or will have to be opened with the surgeon's knife. The sooner it is opened the less the ultimate disfigurement and scarring.

To check the formation of abscesses a liniment of equal parts of belladonna and glycerine should be smeared over the painful part and covered with hot fomentations or poultices; the latter should be renewed frequently. The use of the breast for nursing should be discontinued, and as the two breasts are so intimately connected with one another in their functions, it is generally necessary to give up all attempts to feed the child in this way, and put it on the bottle instead. Immediately the breast becomes at all painful, great comfort will be derived by well supporting it by means of a handkerchief tied round the neck. An abscess of the breast is often most intractable and tedious in healing.

WEANING

The child should be fed for the first six or eight months of its life entirely on breast milk. Until after the sixth month, as we have seen, it is unable to digest any starchy food, unless specially prepared, and the giving of rusks, crusts, and biscuits before this period cannot be too strongly condemned, for they will only set up indigestion, vomiting, and diarrhœa. The process of weaning is somewhat of a crisis in the child's existence, and may be attended with a good deal of trouble and constitutional disturbance. It is important that nursing should not be continued for too long a time, for the sake both of mother and of child. If it is carried on beyond the tenth month the mother's health is very likely to suffer, she becomes pale, thin, nervous, and easily exhausted, and is very liable to develop diseases which in health she would have escaped. The child also will suffer, for the milk in the later months is much less nutritious, and does not supply sufficient nourishment for the baby's development. Nursing is often prolonged with the idea that it tends to prevent pregnancy again occurring, but this is an error. Pregnancy during nursing often occurs and if it does it is a very strong reason for weaning the child. Although menstruation does not usually occur during nursing, it does do so in some cases, but this is not so definitely a reason for weaning as pregnancy. The only trustworthy guide is to watch the effects of its occurrence on mother and child, and if the health of either is seen to suffer, at once discontinue the supply of milk. The time of weaning should be carefully selected in relation to the state of the child His health should be perfect, he should not be passing through a feverish attack, nor suffering from a cold, nor should he be enduring the disturbance of cutting a tooth ; indeed the stage of dentition at which he has arrived is a very useful guide, and an interval of rest in the process is the best time to choose, such for instance as the pause which occurs after the eight incisor teeth have been cut.

In order to make weaning easy it is an excellent plan to have taught the infant to use the bottle early in its life by giving perhaps one meal daily in this way. This has also the advantage that if the mother's health fails, from a feverish cold or other trouble, and her milk becomes deficient, or if she has to be away from the child at the time when a meal is due, an extra bottle or two can be introduced to make up the deficiency without in any way disturbing the child's health. When the time of weaning arrives the number of bottle meals can be gradually increased, and the number of breast meals diminished without the slightest difficulty.

But weaning may be carried out abruptly if it is urgently necessary. The process will involve a few battles, and the infant may indulge in some screaming fits and other evidences of discomfort, but these will probably not last more than a couple of days, and it will then settle down to its new arrangements. The mother may also experience some discomfort from distension of the breasts. But this may be usually soon relieved by applying glycerine and belladonna or cooling lotions to them, by taking occasional doses of aperient salts, and by abstaining from fluids for a few days. These measures are also those which are required if the mother decides at the beginning not to nurse her infant. A very useful form of treatment to prevent the secretion of milk after the confinement is to raise the breasts well up, cover them with a thick layer of cotton-wool, and fix them in this position with a binder firmly applied around the body.

FEVERISH ATTACKS

It is a common thing for infants to show signs of being feverish and out of health when the most careful examination shows nothing else amiss with them. This is one of the peculiarities of infants, that the slightest causes act powerfully on the sensitive nervous system, and disturb the mechanism which controls the temperature of the body, the result being feverishness, but due to causes so slight that they cannot be discovered. The symptoms which appear during these attacks are that the child will not take the breast or his bottle, and seems to have lost all desire for food. He is restless, irritable, fractious, and evidently " out of sorts " ; his face is flushed, his skin is dry and hot, his head feels burning, his breath is short and quick, and his pulse rapid. These symptoms may continue for a day or two, much to the alarm of mother and nurse, and then disappear entirely without any further development, and without any clue being obtained as to their cause. Or they may continue, only in a slighter degree, for days or even weeks, and disappear gradually, leaving their origin still hidden in mystery.

But these facts must not lead us to regard all feverish attacks as unimportant. The greatest care must be taken to find out anything definitely amiss with the child. The fever may be caused by the cutting of a tooth, by indigestion set up by an unsuitable meal, or by the catching of a slight cold. It may also be the first sign of many serious complaints, the initial stage of "sickening for something." The child should be carefully overhauled by a doctor, who might find on examining the chest that a pneumonia was in progress, or from the throat that diphtheria or scarlet fever was about to break out. Many an infectious fever begins with these anxious times.

Causes.

Another condition not uncommon in infants which causes fever, and yet is difficult to recognise, is inflammation of the ears, and the formation of matter. The child is ill, feverish, and in pain, and it is not until a discharge from the ears reveals the secret that we are able to discover the cause. Many feverish attacks are also the result of influenza, and our suspicions should be aroused as to this explanation of their origin if influenza cases are known to have been in the house or neighbourhood.

In some cases of feverishness the child may have enlarged glands in the neck or at the back of the head which make him cry when they are touched. These form what have been called attacks of "gland fever." There is no explanation to be obtained in the throat or elsewhere of why the glands enlarge. The illness lasts but a few days and passes off without further trouble.

Treatment.

The treatment of feverishness of which the cause is unknown is to place the child in a quiet room away from others, and preserve him from all that is likely to disturb his nervous system. His bowels should be acted on by some simple aperient, and his food be of the lightest kind. The ordinary diet should be diluted with water or barley water, and either of these may be given freely in a spoon if the child seems to take it with pleasure. The best drugs would be sweet spirits of nitre, five drops with water every two hours, or tincture of aconite, one drop with water every hour for three or four doses. The effect of these is to make the skin perspire, and benefit in the same direction can be obtained by giving a hot bath, carefully and quickly, and wrapping the baby up in a warm blanket.

A careful watch should be kept on the symptoms, and especially on the temperature, and in most cases of such indefinite ailments the child should be isolated to guard others from possible infection until the periods of incubation of the various infectious fevers have passed.

VACCINATION

The most suitable age for the vaccination of a healthy infant is six weeks, but in many cases the operation is performed earlier, without the slightest risk to the child. Many parents prefer to have it done at about the age of three weeks in order that the monthly nurse shall have the child under her care during the slight disturbance of health which it produces. It is not advisable to vaccinate a child a few days old, as is the custom in some public institutions, unless at the time small-pox is prevalent. The child should be in good health, he should have become well established in his food, whether it be from the breast or the bottle, he should not have been recently weaned nor put upon some new form of food. On the other hand the process should not be delayed until the troubles of teething have begun, when he may already be ailing and feverish. He should not be suffering from convulsions, from diarrhœa and vomiting, tuberculous glands, eczema or other skin eruptions. The ill effects attributed to vaccination are too often due to carelessness in these matters. The right course to pursue, if the child is suffering from any complaint which renders it unfit for vaccination, is to obtain a certificate from a doctor of postponement of the operation until the health is restored.

Lymph is now almost always obtained direct from the calf, and is glycerinated to preserve it and free it from all contamination. Until a few years ago the lymph was usually obtained from the arm of another child that had been recently vaccinated, but this arm-to-arm method, as it is called, has now been discontinued. The chief objections which are advanced against vaccination are that injurious effects result from the practice. It is said that the poisons of certain diseases are inoculated with the lymph, and that erysipelas, syphilis, tuberculosis, and other complaints are transmitted in this way. It is very important to appreciate that everything that happens to a child after vaccination is not necessarily due to that operation. The many attacks of eczema and other skin eruptions which follow would in the great majority of instances have occurred even if vaccination had never been performed. Now that glycerinated calf lymph is almost universally employed the danger is reduced to a minimum, and the risk of imparting human diseases is absolutely avoided, nor is there any but slight hazard of communicating any disease peculiar to the cow, because few such diseases are transferable to man, and their presence in the calf is easily detected. Calf lymph prepared with glycerine is also practically free from all extraneous organisms. The only dangers now to be guarded against are those which occur at the operation, and those which result from the spots becoming inoculated after the vaccination has successfully "taken," through carelessness in keeping the part clean and protected from germs.

In an infant the best situation for vaccination is on the shoulder, and for choice the left side, as it is then not liable to pressure against the body of its nurse. If desired, it may be performed on the leg, so that the scars shall not show, but it is difficult to keep the leg of an infant always clean, dry and at rest. In an adult, if this site is chosen it may be necessary to remain in the recumbent position for several days, for movement is likely to inflame the spots and set up enlargement of the glands in the groin. Occasionally vaccination is done over birth marks with the intention of destroying them by the inflammation and subsequent scarring. The lymph should be inoculated in four or five places sufficiently far apart to obviate their running together. The protection thus afforded is greater, and the effect on the arm less severe, than when one spot only is inoculated.

The Operation.

The operation is carried out as follows: The arm is well washed with soap and warm water, carefully dried with a soft towel, and gently rubbed until the skin becomes red. The skin is then slightly stretched with the left hand, by which also the movement of the arm is restrained. The skin is then punctured with a surgically clean needle or a number of superficial scratches are made with a surgically clean lancet, and a drop of lymph is placed upon each spot and carefully rubbed into it.

When the blood and lymph have become thoroughly dried, the spots should be covered over with a piece of lint, cotton-wool, or gamgee tissue, which may be kept in position by a strip of plaster or bandage. But as these are likely to constrict the part and cause swelling, an even better plan is to fix them in position with a safety pin, through the sleeve of the garment worn next the skin. The spots should not be washed for twenty-four hours, but afterwards, when they have developed, they may be bathed without any harm.

The redness caused by the operation subsides in a few hours, and all remains quiescent for about three days, which forms the incubation stage.

On the third or fourth day red spots form at the points of inoculation, which gradually develop into blisters in the course of the next five days. These blisters are of peculiar appearance, being in the form of a ring with a distinct depression in its centre. They are surrounded, by the fifth day, with a ring of redness, which grows wider up to the ninth or tenth day, and then subsides as the spots dry up. It varies in width in different cases, from ¼ inch to 2 inches, and is accompanied by heat, tenderness, swelling, and hardness in proportion to the severity of the inflammation. Matter forms in the blisters at about the tenth day, the spots gradually dry up and form scabs, which loosen and fall off from the fourteenth to the twentieth days, leaving a reddish scar. The redness disappears slowly, and after some months the scar becomes white, indented and pitted.

General Symptoms.

At about the third day the child becomes fretful and restless, and less inclined to take its food ; the temperature may be found slightly raised, and may continue so for three or four days, and is accompanied with slight quickening of the pulse and respiration. This disturbance of the general health usually subsides as the spots pass their maturity, and is seldom connected with any other symptoms.

Treatment.

Apart from keeping the spots clean and protected, no treatment is usually necessary, but if the redness, swelling and pain are at all troublesome, they may be rapidly relieved by the application of a compress of boracic lint soaked in warm water, and covered with oil silk. A very useful lotion to paint over the spots and redness is made by mixing oxide of zinc powder and water to the consistency of cream. It is astringent and sedative. A common custom is to make use of a vaccination shield to protect the sore spot from injury, but these are difficult to keep clean, and if soiled they are likely to cause much trouble in the healing of the wound ; they are also apt to rub the scabs off the spots and produce an open sore. It is far wiser never to make use of them. The general symptoms usually require no treatment ; the bowels must be kept regular, the diet unchanged, and no medicine need be given. If the fever runs at all high, 1-drop doses of tincture of aconite or 10 drops of solution of acetate of ammonia in water are useful.

Although the foregoing is the normal course of vaccination, yet there are many variations. The pocks may heal more rapidly, especially in those who have been previously vaccinated, or they may continue as moist, inflamed sores for a much longer period. The latter result is usually due to easily preventable conditions, such as injury by other children or by shields or dirty sleeves or dirty applications. It may also be caused by want of cleanliness in the management of the arm, or by ill health in the child, or insanitary conditions in its surroundings. Unhealthy developments in the healing of pocks are practically unknown amongst the well-to-do classes, and the moral is not difficult to understand.

Complications.

Although it is not reasonable to consider that skin eruptions that follow vaccination are all caused by it, there is no doubt that eruptions of various kinds may be set up by the inoculation of vaccine or by the irritation developed at the seat of the wounds. These eruptions are as a rule quite harmless, but they may give rise to much irritation and distress to a delicate infant. They appear in a most irregular manner upon all parts of the body, and rapidly disappear without treatment, lasting as a rule but a few days. Rigors, too, may develop, and, in infants, convulsions. Some persons, especially adults and elder children, show more severe general symptoms, such as headache, sleeplessness, irritability and languor, with digestive troubles—loss of appetite, sickness and diarrhœa.

TEETHING AND ITS DISORDERS

The time when an infant "cuts" his teeth is in many ways a critical one. Although many a healthy child passes through the whole process without "turning a hair," yet it is not at all infrequent for an infant who has previously thriven to begin, as dentition sets in, to develop badly, to suffer from derangements of the digestion, and to show signs of deficient nutrition. We must look upon dentition as a natural process and not a disease, but at the same time it undoubtedly acts indirectly on the nervous system and the body generally, and may give rise to many troubles.

The first set, the temporary or milk teeth, are twenty in number. In health the first to be cut are the two central teeth in the lower jaw, called the central incisors; these appear from the sixth to the eighth month. After an interval of from three to six weeks they are followed by the four central teeth—the central and lateral incisors—of the upper jaw; these appear from the eighth to the tenth month, and are cut at intervals of a week or two.

Order of Cutting.

After a rest of two or three months the two lower lateral incisors come through, and are quickly succeeded by the upper and lower front molars or first double teeth, which are all cut during the twelfth, thirteenth, and fourteenth months. The upper canine or eye teeth follow in three or four months, and the lower eye teeth shortly afterwards, all being through by the twentieth month. Finally, the set is completed by the cutting of the posterior or second molars from the age of two to two and a half years. A child, therefore, of one year old should have cut eight teeth, and be in the process of cutting four more. This may be looked upon as the regular routine, but there are many variations from it. Children have been born with teeth already showing, or on the other hand the first tooth may not show itself until the child is more than a year old. The teeth may also appear in an order different from the usual one, and the child is then said to "cross cut" them. Sometimes the whole of the milk set may never be completed, one or two being absent, but these various abnormalities are of no importance, and need cause no anxiety. The chief cause of delayed teething is rickets, and although the late appearance of the teeth is not a proof of a child being rickety, yet it is quite sufficient to raise the question, and should lead to a careful examination from this point of view.

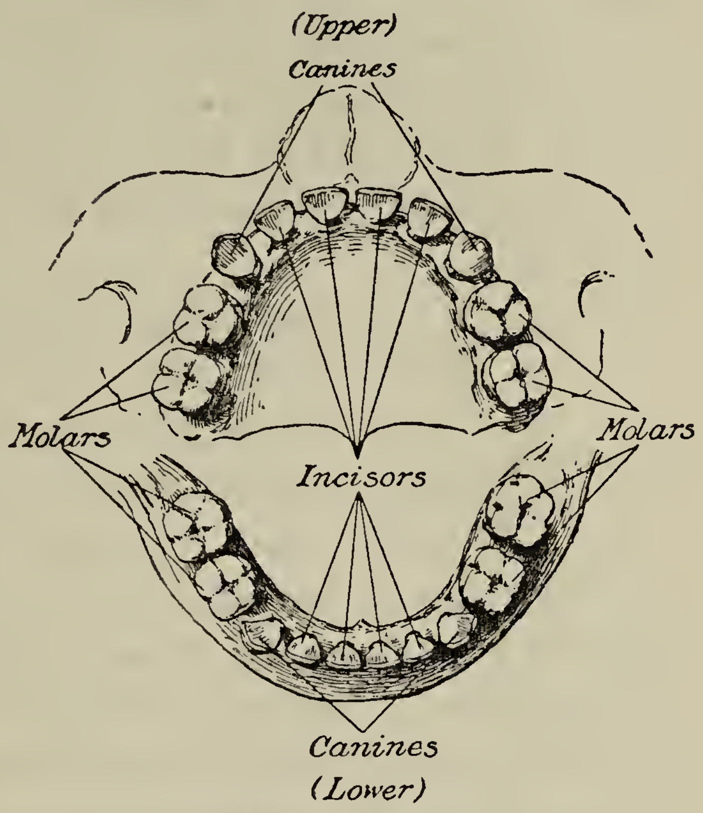

Fig. 93.—The Temporary Teeth.

Acute feverish illness is also an occasional cause of late dentition.

It is a common practice of anxious mothers and nurses to explain most ailments which occur during the time occupied by the cutting of the teeth as due to teething, and although the irritation and pain caused by a tooth forcing its way through the gum may cause many symptoms, yet it is wise to make sure that no other cause exists, and avoid the danger of neglecting important departures from health by the explanation that it is "only teething."

During the fifth or sixth month a large amount of saliva is formed, and the child dribbles a great deal. He is constantly putting his fingers into his mouth as if something were troubling him in his gums, he loves to gnaw his "comforter," and any other hard object he can lay his hands on. He is also liable at this time to be "off" his food, to sleep restlessly, to wake frequently and cry constantly. He gets flatulence, is sick and often feverish. Now these symptoms may be due to teething, and indeed often are, but they may also be due to something unsatisfactory in the child's diet, and if so they should be treated by a change in this respect rather than by the routine employment of "teething powders."

Feverishness.

Children are also liable to attacks of feverishness, especially at night; they are restless and hot, and give their mothers many a sleepless night although in the day time they may seem comfortable and well. If the mouth is examined the gum is found swollen, tender and red, over an approaching tooth. This condition may be relieved by lancing the gum, but it can be relieved as well and with far less likelihood of doing harm by gentle rubbing with the point of the finger. Bromide of potash in doses of from one to five grains dissolved in water and syrup is beneficial, and the medicine may be used as a sedative for rubbing on the gums.

Stomatitis.

Stomatitis or inflammation of the mouth may be set up by teething, especially the part near the tooth which is being cut. There may be also little sore patches surrounded by redness which are very painful, and which cause a good deal of difficulty in sucking and in drinking fluids that are hot or salt. These may be relieved by letting the child suck the finger tip dipped in borax and honey, or in boracic acid and glycerine, and by cleaning out the mouth with wool soaked in the following lotion:—

PRESCRIPTION 251

Borax	½ drachm.
Tincture of myrrh	½ drachm.
Glycerine	1 drachm.
Rose water to 1 ounce.	

These mouth troubles are liable in some children to cause enlargement of the glands of the neck, under the jaw or at the side of the face. In delicate children there is a great tendency to glandular disorders, and there is always the possibility to be considered that the enlarged glands may inflame and form an abscess. The unhealthy condition of the mouth should be treated and the glands fomented, and care taken to keep them from irritation, friction, or other injury.

Enlarged Glands.

One of the troubles of teething most frequently feared, but not very frequently seen, are convulsions. These do not occur in healthy infants, however great the irritation may be that is set up by the teeth. They are, however, not unfrequently seen in children who suffer from rickets, and in those whose nervous system is unstable by inheritance from nervous parents. It is in these cases that lancing of the gums over the offending tooth is often followed by rapid relief.

Convulsions.

During dentition infants are exceedingly sensitive to any exposure to cold, and catch cold far more easily than at other times. They should, therefore, be kept warm, their feet covered with woollen socks or shoes, and their stomachs carefully protected from chill. One of the commonest results of chill at this period is catarrh of the bronchial tubes, a bronchitis of teething which may rapidly spread to the lungs if neglected, and cause severe illness. This sensitiveness is very marked during the eruption of the front or incisor teeth. The treatment consists in extra care, nursing the child in a warm room and letting him inhale steam. His bowels must be kept free.

Colds and Chills.

A chill during teething may also set up digestive troubles—diarrhœa, vomiting, stomach-ache, and loss of appetite. But these symptoms may also arise apart from cold, especially during the hotter months. They may be due to a spread of catarrh from the mouth or air passages. But it must never be forgotten that these disturbances of digestion are in the great majority of cases due to improper feeding. The infant whose teeth are troubling him is cross, and fretful, and cries constantly, and to comfort him and keep him quiet is given many unsuitable things; he is allowed such sweetstuffs as honey, glycerine, and sugar, and these set up fermentation, flatulence and digestive disturbance. Or he is given the breast or the bottle too frequently, his stomach becomes upset, and indigestion results. Such attacks are met by careful supervision of the food, which must be given at regular hours and at proper intervals. If the child is bottle-fed the food should be weakened by the addition of water, or the milk may be peptonised, or mixed with one-third of lime water. Grey powders are useful to check the diarrhœa; a ½-grain powder may be given twice a day for two or three days, or the following prescription of a good teething powder may be taken to the chemist:—

PRESCRIPTION 252

Grey powder	½ grain.
Bicarbonate of soda	2 grains.
Bromide of potash	2 grains.
Cinnamon	½ grain.

Send six powders. One to be given twice a day.

Eruptions.

Eczema, red-gum and nettlerash are all frequent concomitants of teething, and are generally due to disturbances of digestion, especially acidity caused by fermentation of the food. Many a most troublesome and severe attack of eczema, which may last for months, is started at this period of infant life. To prevent these complaints, the attention has to be directed to the diet, and through it to the digestion. The bowels should be cleared, and one of the powders just recommended for digestive disorders should be given for a few days, whilst the treatment described in a later chapter should be employed locally.

Before the teeth are actually cut, a white line or point can be seen through the gum; around this the gum may become swollen, red, and tender, and much relief may sometimes be afforded to the child, and his pain and discomfort removed, by a careful incision with a gum-lancet. Fits of crying, feverishness, and even convulsions, may often be quickly relieved by the timely employment of this simple measure, if it is definitely seen that they are due to the eruption of some particular tooth.

Lancing the gums used to be the usual habit with the old physicians, and it was but few children who cut their teeth without such assistance. The custom is now seldom adopted, partly because teething disorders are recognised to be due less to the local condition of the gum than to disturbances of function set up by other causes, and partly because the little operation is not unaccompanied by danger. The bleeding caused by it is sufficient in many cases to injure the health of a delicate infant, and the wound produced is difficult to keep clean, and may become infected with decomposing food or germs.

Great care should be taken of the milk teeth; they should be cleaned regularly with warm water or some simple lotion, and all food removed from their interstices. If they become decayed they should be examined by a dentist, and when possible stopped as carefully as the permanent set.

THE SECOND SET OF TEETH

Although the second dentition does not occur during infancy, it will be convenient to describe it in this place.

At about the age of six children begin to lose their first set of teeth in order to make room for the permanent set. There are altogether thirty-two permanent teeth, twelve more than the temporary set. (*See* Fig. 3, Vol. I., p. 52.) The first to appear are the anterior molars, at six years of age; they come through the gums behind all the teeth of the first set. At seven the central incisors replace the temporary ones, at eight the lateral incisors do likewise. The front bicuspids at nine take the position vacated by the first temporary molars, and at ten the back bicuspids that of the posterior molars of the milk set. From eleven to twelve the permanent canines are cut, from twelve to thirteen the permanent second molars, and from seventeen to twenty-five the third molars or wisdom teeth. The wisdom teeth are very uncertain in the time of their appearance, and indeed may never find their way through the gum at all.

The second set seldom cause the same troubles as the milk teeth; indeed the first molars and incisors may make their appearance quite unobserved, although the second molars may give some trouble. The gums may become inflamed and bleed, and cancrum oris, dealt with in Chapter XLVII., may arise, but with cleanliness of the mouth and the supervision of the dentist no trouble need be anticipated. It is during the cutting of the second set of teeth that St. Vitus's dance and epilepsy are liable to declare themselves, although they are not to be traced to dentition. In delicate children gastric and intestinal disorders also arise, there is great susceptibility to cold, and a tendency to bronchitis and catarrh generally.

CONGENITAL DISEASES

The first stage of an infant's existence is the one before its birth, and during this many diseases originate. These are usually the result of some imperfect development of the parts, but one disease is directly transmitted by the parents. This is hereditary syphilis, and its description will be found amongst the general diseases of children, in the next chapter. Although the great majority of children are born perfectly healthy and well formed, it is the custom for the doctor or nurse carefully to inspect the child's body to see if all is satisfactory before it is washed and dressed, and various conditions may be discovered in the course of such an examination.

Thus the circulation may be found imperfect, the body blue and dusky, and the blood imperfectly mixed with oxygen. This is called cyanosis, and is due to imperfect formation of the heart from failure of the natural changes which should occur at the time of birth. It is discussed under the disorders of the circulatory organs of children.

The skin may show various red or purplish spots called birthmarks or nævi, or there may be black patches called moles. About the mouth may be found the deformities of hare lip, cleft palate, or tongue-tie; about the limbs extra fingers or toes, club foot, or a dislocated joint, the hip-joint being especially liable to this accident. The genital organs must receive careful attention, as a very common condition is an excess of skin on the penis, with a very small orifice, which often leads to difficulty in passing water, and can only be relieved by the operation of circumcision. Here, too, may be discovered signs of a rupture, but in infants this complaint is more likely to develop at the navel, at which a distinct bulging may form after the separation of the umbilical cord.

Other congenital diseases, such as blindness, deafness, and mental weakness, develop later, and cannot be discovered at this stage. All these conditions will be dealt with in their respective places.

CHAPTER XLVI

GENERAL DISORDERS OF CHILDREN

Rickets—Hereditary Syphilis—Tuberculosis—Scrofula and Struma—Rheumatism.

RICKETS

RICKETS, or rachitis, called in Germany the English disease, is a common disorder of children. It first shows itself before the child is two years old, begins usually after he is six months, but may manifest itself earlier, and some instances are known in which it existed in a marked degree at birth. It is a general disease affecting all parts of the body, including the nervous system, but its most marked features are seen in the various bones of the frame, upon which it produces many kinds of deformity.

Cause.

It originates from an insufficient supply of nutrient material, and although produced in many ways, can always be traced back to this condition. Inheritance is a strong factor in its production, for the tendency to it can in many cases be distinctly traced to debility, or disease in the parents, especially in the mother. The parent's ill health may have been due to poverty, hardships, or imperfect digestion, to exhausting discharges, to tubercular disease or syphilis. The influence of the mother's health in producing rickets is shown by the occurrence of the disease in the first-born child of a very young mother, and not in the later children, and also in the youngest children of a large family, who were born when the mother had become weak and exhausted, and not in those born when she was strong and healthy. Unhealthy surroundings during infancy are actively injurious to the health, and tend to the production of rickets. This is shown by the much greater frequency of the disease in the children of the poor classes, especially those who live in towns in dark, damp, filthy or overcrowded houses. It is seen in the children of the well-to-do, but far more rarely, and in a much milder form.

Last, but most important of all as a cause, comes the food of the infant, whether it be insufficient in quantity or unsuitable in quality. The food may be deficient owing to the mother's health, a weak, badly fed and overworked woman supplying but watery and innutritious milk. In cases of prolonged nursing also the milk becomes deficient in nutritive ingredients, and unless the child is supplied with other food he is very liable to develop rickets. In bottle-fed infants who have not been given a proper substitute for mother's milk, the disorder is common, and also in those who have had large quantities of sago, sopped bread, arrowroot, inferior condensed milk or certain popular patent foods. Even in children who have been well fed on good, rich, fresh milk, the complaint may develop, but in these cases there has been some severe or long-continued trouble of the digestive organs which has prevented proper assimilation of the otherwise suitable food, or some severe disease such as diarrhœa, gastric catarrh, bronchitis, whooping cough, or pneumonia, which has so lowered the health that the assimilative powers have been insufficient for the task thrown upon them. The ingredients of food which by their deficiency set up this disorder are fats and earthy salts, and this has been proved by the development of the disease in young animals whose diet is made purposely deficient in these substances. On the other hand it is said that rickets is an unknown disorder amongst the Japanese, because of the large amount of fats and oils which are included in the diet of their nursing women and young children.

Symptoms.

The symptoms of rickets are usually very gradual in their onset. The child seems out of health, he is irritable and fretful. He refuses his food or takes it badly, his bowels are constipated or irregular, and his motions may be most offensive and contain undigested curds of milk. His complexion grows sallow and pale, and his sleep much disturbed, his nights are restless, and he persistently kicks the clothes off him, and sweats profusely. The perspiration chiefly affects the head, neck and chest, wetting the nightdress and pillow, soaking the hair and standing in beads on the forehead. Occasionally there is slight fever, which is highest of an evening, and may disappear altogether in the early part of the day. There may be tenderness all over the body, so that the child cries on being touched, and evidently dreads to be moved about or danced in his nurse's arms ; he is only comfortable when left alone in his cot resting on a soft mattress and pillow. Convulsions are a common accompaniment of the disorder ; they are set up by very slight irritation, and vary in severity in different cases from passing spasms to fatal attacks. A frequent complication is spasm of the glottis which may occur quite suddenly without warning, and place the child in imminent danger, the breathing being altogether arrested for from a few seconds to half a minute. When the child is excited he may have what are called "breath-holding spasms." The face is flushed, and the breathing ceases entirely for some seconds, and then the child seems as well as before. All the symptoms are evidences of the sensitive and imperfectly nourished condition of the nervous system.

Rickety children are excessively liable to suffer from catarrh from the slightest exposure to cold. This may affect the mucous membrane of the air passages, or the digestive organs. Bronchitis, pneumonia, gastric catarrh, and inflammation of the eyes are all common. The respiratory disorders are particularly dangerous, for the softness of the walls of the chest, to be referred to later, renders it difficult for the child to distend the lungs properly with air or to cough with any vigour. For this reason whooping cough is a very fatal disease when occurring with rickets, and measles is much more serious than it would otherwise be from the tendency to bronchitis which accompanies it. Catarrh of the digestive organs also has far more serious consequences in this disorder, for the child is already suffering from the results of malnutrition, and anything that interferes with his nourishment at once places him in a state of danger. The abdomen in this complaint always protrudes, partly because of the forcing out of the lower ribs, and partly from the great tendency to excessive distension of the bowels with wind. A rickety child is almost always "pot bellied." The muscular system also suffers with the rest of the body. The child may not be able to sit up from the weakness of the muscles of his back ; he does not crawl about, like a healthy child, but is quiet and passive without amusing himself or wishing to be amused. Walking is always a very late acquirement, and may not be learnt until the child is three or four years old, or even later.

It is quite possible, when the affection is but slight, that the only signs may be an enlargement of the wrists and of the ribs on each side of the breast bone.

These are two of the many changes which occur in connection with the bones, for every bone of the body may be involved. The condition is characterised by the imperfect development, softness, and consequent distortion of the bony structures. The bones consist of a gelatinous material very deficient in the natural lime salts which should give to them their hardness; they become spongy and soft, and bend with great readiness. They are so soft that they can easily be cut with a knife. Although the softening affects the whole of each bone, yet it is particularly marked at the ends where growth is taking place most actively, and in the long bones these parts are also much thickened. The thickening is most noticeable at the wrists and ankles, which become enlarged and thicker than natural, and it has given rise to the term "double jointed," though it is not the joints that are affected, but the bones in their neighbourhood. The thickening of the ends of the ribs at the point where they join the gristle that fixes them to the breast bone is an interesting and very characteristic sign of rickets. It produces a row of knobs or "beads," as they are called, passing downwards and outwards on each side of the chest, and these have received the name of the "rickety rosary or necklace," and should always be looked for when the disease is suspected. At the site of the beads the chest is weak and its rigidity impaired, so that there is a distinct falling in on each side, forming a groove at the deepest part of which the "beading" of the ribs can be felt. At the same time the breast bone is pushed forward and is more projecting than natural, thus producing the deformity known as "pigeon breast."

Changes in the Bones.

The spine also may be affected, its natural curves being much exaggerated. In young children who have never walked the spine forms one long curve projecting backwards, whilst in older children whose limbs have become deformed by the weight of the body the curve is at the middle of the back, and projects forward to compensate in some degree for the deformity. These spinal curvatures are not painful, are large and rounded, and can be temporarily quite removed by raising the child by the armpits. The bones of the pelvis or lower part of the body are also twisted and contracted, a matter of real danger in later life when occurring in girls, for it may present an insuperable barrier to the birth of children.

The skull of a rickety child shows many divergencies from the natural shape. It grows very big, with an exceptional development of the forehead, which is high and prominent, and appears larger than it really is from the fact that the face remains small and ill-developed. The top of the skull is very flat and square, and the fontanelles (or natural openings) may remain open until the child is three or four years old instead of closing at the fifteenth or sixteenth month. The appearance of the skull, coupled with the dislike for sports which occurs in older children, who prefer to sit with their elders instead of playing with their fellows, may lead to the belief that the mental powers are exceptional, but this is far from being the fact, for the intellectual powers are not unfrequently as deficient as the physical. A curious condition is sometimes met with in infants in which the back of the skull becomes very thin from the pressure exercised on it in lying, and if the fingers are carefully pressed on it it may be felt to bend and dent inwards. The hair is generally scanty in amount. The jaws are often malformed, the teeth developed very late, a long interval separating those cut before and after the development of the disorder. In the long bones many deformities are produced, the direction in which the bones bend being dependent upon the age of the child, whether it is in arms, when the pressure is caused by the arms of its nurse, or is capable of walking, when the pressure is due to the weight of the body. In various ways knock-knee, bow-legs, and various deformities of the feet are formed.

It must not, of course, be imagined that all these deformities show themselves in any single case, but if several do so the body is much mis-shapen, and in most children who suffer from this disorder the growth is very imperfect and the body stunted.

Rickets does not often prove fatal, but as we have explained, it adds greatly to the dangers of many of the diseases of children. Its tendency is to recovery, but it may be drawn out over many years. Treatment is, however, very successful, and the majority of cases get quite well, and the child grows up to be a healthy man or woman, but handicapped often with disfiguring deformities.

Treatment.

All the known causes of rickets should be removed, the child should be properly and sufficiently fed, easily digested fatty foods being essential; cream, whey and raw meat juice are all useful, curd of milk must be given sparingly, and all peptonised and tinned foods must be avoided, and the greatest care should be taken that no articles of diet are allowed which disturb the digestive functions and cause catarrh, vomiting or diarrhœa. The bowels should be carefully regulated with simple measures—injections or drugs—and constipation strictly corrected. The child's surroundings should be rendered as sanitary as possible, and he should be supplied with abundance of fresh air; he should as far as possible live out of doors. Every care should be taken to avoid chills, knowing the danger that they entail. The body should be well wrapped up with warm woollen clothes, and the face and chest protected. Sea-air is invaluable for rickets, and the greatest benefit may be expected from a change to some healthy seaside or country place. The child should not be encouraged to stand or walk or use his limbs, for the various deformities will develop. He should lie on a soft and even mattress in a cot or carriage, with the body and limbs uniformly supported. Nursing is not to be recommended, for the bones are more likely to be bent, nor should the child be allowed to sit up much lest his spine become bowed outwards. Profuse sweating may be remedied by sponging with vinegar and water. Dyspeptic troubles should be at once corrected with appropriate medicines. The most useful drugs are cod liver oil, malt extract, iron and phosphorus.

Cod liver oil should practically always be given, but only in small doses of from 10 drops to a teaspoonful, three times a day. It may with advantage be mixed with an equal quantity of malt extract or of steel wine, and should be taken shortly after meals. Phosphorus also may be given with cod liver oil, $\frac{1}{200}$ to $\frac{1}{100}$ grain according to age, two or three times a day after meals. Saccharated wheat-phosphates, which are the soluble part of bran, combined with milk sugar, are useful; half a teaspoonful may be taken as sugar with food, two or three times a day, and the dose gradually increased. It is not necessary to give lime salts as a rule, for proper food contains an ample quantity. Some, however, have great belief in the value of lime water and advise that a fourth part of lime water should be added to all the milk taken.

The treatment of the various deformities is considered in another chapter. When the bones are still soft much may be done by rest in suitable position, combined with the careful pressure exercised by well applied splints and bandages. After the bones have hardened, nothing but an operation can be of any benefit, but by surgery an immense deal can be done to relieve the most crippling deformities.

HEREDITARY SYPHILIS

Syphilis is a disease produced by a parasite, and affects all parts of the body. The disease as it occurs in the adult is described amongst surgical disorders. A child may become inoculated with the poison in two ways—(1) at the time of birth into some sore or crack, (2) by direct transmission from its parents. The first, the acquired form of the disease, is similar to that which affects adults, and will not be described here. The second is hereditary syphilis.

Transmission.

The poison may be derived from either parent or from both, and the risk of infection to the infant depends upon the time which has elapsed since the parent was affected; the longer the time the less the danger. Rarely the infant is born with distinct traces of the disorder, but it is far more usual for the child to be perfectly healthy in appearance at birth and for the symptoms to break out from a fortnight to two months afterwards. The earlier the symptoms appear the more severe will be the attack.

Symptoms.

The premonitory signs of coming trouble are feverishness, irritability, restlessness and digestive disturbance. Next the nostrils become blocked up, and the child "snuffles," and it is imagined that he is suffering from a common cold in the head. A large amount of secretion obstructs the nostrils, and may cause a good deal of difficulty in sucking, as it prevents the infant from breathing through the nose. A rash now breaks out in various parts of the body, the favourite situations being the thighs, genital organs, around the orifice of the bowel, and on the forehead. It is formed of small round pink spots, the colour of which disappears altogether if they are subjected to pressure of the finger. The eruption, at first a bright red, becomes in the course of a few days a peculiar "lean ham" colour and somewhat scurfy. This colour is very characteristic of the syphilitic rashes. On the soles of the feet and palms of the hand, the red pimples may form very thickly; they fuse together, become scurfy, and give rise to a thickened dull red surface. Another form of eruption is that of blisters, the fluid in which rapidly becomes mattery or even bloodstained. It most commonly affects the palms and soles, but may appear on other parts. It is of serious import; the earlier in life it appears the graver is the outlook.

The mucous membrane of the mouth becomes hot and red, and the gums swollen; little swollen patches form just inside the mouth from which deep cuts spread out of the corners of the mouth on to the cheeks, and leave permanent disfigurement in the shape of radiating scars. These mucous patches as they are called may also appear on the skin wherever it is thin and kept moist, as around the mouth or anus, where the skin and mucous membranes join. The discharge from the nose, at first watery, soon becomes thick and irritating, and later still mattery and bloodstained ; it causes sores on the upper lip which soon become covered with scabs. The disease in the nostrils often leads to a flattening of the bridge of the nose which forms one of the characteristic points of the syphilitic physiognomy, the radiating scars being another. The inflammation spreads in many cases from the back of the nose to the throat and windpipe, and gives the child a peculiar hoarse cry.

The general nutrition of the infant is much disturbed, the body wastes rapidly, the skin assumes a peculiar anæmic earthy colour, and the countenance is withered and shrivelled, like that of an old man. Many of these cases prove fatal, from malnutrition caused by disease of internal organs such as the liver, stomach, and intestines, or from indigestion and diarrhœa. In some instances, however, the child remains plump and healthy-looking, and if its strength is sufficient to survive this stage of the disease, the symptoms gradually subside, and may entirely disappear in the course of a year, except for the permanent disfigurements which have been mentioned.

In a certain number of cases, especially those in which the early symptoms have been overlooked or in which treatment has been neglected, a recrudescence of symptoms, forming a sort of relapse, occurs about the second or third year ; the mucous patches, sores of mouth, and cracks of lips return upon the parts, which are kept constantly moist and irritated.

Later still, about the age of puberty, in cases which have not been cured by treatment, far more severe symptoms again break out.

One frequent and very characteristic condition affects the eyes, called "interstitial keratitis." It is a chronic inflammation of the cornea or clear surface at the front of the eye. Both eyes are involved, the disorder beginning in one but appearing in the other in a month or two. They become watery and irritable, and if examined the transparent part or cornea looks white, cloudy and "steamy." After a time the whitish colour gives place to a red hue produced by a large amount of blood in the part. This disorder is of very long duration, taking months or even years to recover, in spite of the most skilful treatment, but the great majority of cases get completely well.

Inflammation of the ears is another serious trouble which is unfortunately very frequent in this complaint. It may attack the middle ear, but is far more often an affection of the nervous mechanism of the inner ear. It is recognised by deafness, which comes on gradually, and grows worse and worse in course of time, and often ends in complete loss of hearing, for it involves both ears and is very intractable to treatment. Chronic sores (ulcers) of the skin or mucous membranes are common, and are especially frequent in the mouth. The uvula and soft palate are sometimes entirely destroyed in this way. The bones also in this late stage are often diseased ; the skull may become thinned as in the cranio-tabes of rickets, or it may be affected by bony outgrowths which may easily be felt through the scalp by running the hand over the top of the head along the middle line. A very serious bone trouble is sometimes met with in the roof of the mouth by which a hole is eaten through the bone into the nose ; such a condition is seldom caused by any other disease than syphilis. Another affection caused by syphilis is inflammation of the growing portion of the long bones by which a form of paralysis is set up from the pain and tenderness ; an arm so affected will be swollen, tender, and hang useless at the side. A peculiar sign of the presence of this disorder, described by Sir Jonathan Hutchinson, is shown by the teeth. In the permanent set the two centre teeth of the upper jaw—the central incisors—are badly developed ; they are usually short, and the cutting edge is narrow from side to side and very thin, it is also shaped into a broad shallow notch, which lasts for years until at the age of 20 to 30 it disappears, being ground down by wear. The teeth are called "notched" or "peg-top."

Lastly, certain nervous disorders may be caused by hereditary syphilis. A chronic inflammation may arise in the brain which finally leads to mental weakness and permanent imbecility, or "water on the brain" may be set up.

A question which has given rise to much discussion is the possibility of syphilis being transmitted to the third generation : whether a person who is the subject of hereditary syphilis can transmit the poison to the children of the next generation. Many persons who have suffered from late symptoms of hereditary syphilis are known to have married and had healthy children, completely free from taint, and although the question cannot be answered with an absolute negative, it is quite certain that transmission to the third generation can only occur with the greatest rarity.

This is a disorder in which the treatment should be commenced many months before the child is born, for if it is known that either parent has become infected, or that other children have been born previously with the disease, a prolonged and thorough course of medicine should be administered to the affected parent, in order completely to eliminate the poison from the system. In this way, in most instances, any children born subsequently may be healthily developed, and may come into the world not only free from symptoms but also free from all infection.

Prevention.

Treatment must be long and continuous, and must throughout be carefully watched, as wasting is in many cases rapid, and may eventually be the cause of death; and as digestive troubles of all sorts are very liable to arise, the greatest attention must be paid to the infant's food. The best food is undoubtedly, as in all children, the mother's milk, and if this is supplied in sufficient quantity nothing more is necessary. It is an important and interesting fact that an infant affected with this disorder, derived from the father, can be nursed by his mother without transmitting the disease to her. Yet if the child is reared by a wet nurse she is practically certain to become infected, and in course of time will develop the usual symptoms. This renders all idea of a wet nurse out of the question, and if the mother has insufficient milk the child must be brought up on the bottle, much as this will add to the difficulties of rearing him, and to the risk of the disorder taking a downward course. It is necessary to exercise the most scrupulous care and cleanliness in connection with the feeding, and it must never be forgotten that the discharges and secretions are capable of transmitting the affection to healthy persons.

Treatment.

The one drug which is required in every case of syphilis is mercury. It is strong and active, and may cause symptoms of poisoning, such as a copious flow of saliva, inflammation of the mouth, and a swelling or what is called sponginess of the gums. These should be looked for, and if they appear they are a definite indication that mercury should be stopped for a time, and only returned to with caution, and in smaller doses. The most usual form in which to administer it is in grey powder (a mixture of mercury and chalk), ½ grain twice a day. It should be continued for weeks, and gradually increased until all symptoms have disappeared, which will certainly mean from six weeks to two months, and it must be resumed at once if any relapse occurs.

Another method of administering the drug less likely to disturb the digestive organs is often employed in infants; the mercury in the form of an ointment is rubbed on the skin, by which it is absorbed. The skin should be first well washed with warm water and soap, and then a small piece of the ointment about the size of a pea should be rubbed on the side of the thigh or in the armpit, or it may be smeared on the flannel binder and rubbed in by the movements of the child. This should be used daily. Five drops of a 10 per cent. solution of oleate of mercury may be substituted for the ointment, or the child may be given a daily bath in which 10 grains of corrosive sublimate has been dissolved. In the last case care must be taken that the child does not swallow any of the water. In addition to the mercury other drugs may be required. A grain of chalk and opium will overcome any diarrhœa that may be set up. Ten drops of cod liver oil three times daily will aid in the infant's nutrition. Half a grain of saccharated carbonate of iron will relieve anæmia. In the later stages, especially after mercury has been discontinued, 1 or 2 grains of iodide of potash or from 5 to 10 drops of the syrup of iodide of iron are very beneficial, and larger doses still will be required to remove chronic ulcers and diseases of bones.

Various local measures will also be necessary. The nostrils should be cleared of discharge by the use two or three times a day of a nasal douche of boracic acid, 5 grains to 1 ounce of warm water. The same lotion may be used for the mucous patches in the mouth, and the eruptions and patches of the skin when moist may be relieved by powdering with equal parts of boracic acid and starch, or with oxide of zinc.

TUBERCULOSIS

Sources of Infection.

Disorders caused by the tubercle bacillus are exceedingly prevalent in the early periods of life. One of the most frequent means by which the bacillus finds its way into the body in infants and young children is in milk. As this fluid forms the only—or at any rate the chief—article of diet, the importance of this factor is obvious. The milk becomes infected only when the udders of the cow are diseased, and not when other organs of the animal are affected, be it ever so seriously, so long as the udders are healthy. Not only is the milk dangerous in these circumstances, but the butter, cream, buttermilk, and skim-milk are highly infective. It is probable that other conditions as well are necessary to produce infection, for fortunately every child who drinks tuberculous milk does not become diseased. The gastric juice may in some cases destroy the bacilli, or there may be no suitable soil in the healthy infant's organism where it may take root and develop. The disease in this mode of infection first shows itself in the intestines in the form of "consumption of the bowels," in which the mucous membrane of the intestines becomes ulcerated and destroyed. The disease may spread to the peritoneum, causing tubercular peritonitis, and to the glands in connection with those parts, setting up the disease called tabes mesenterica.

The infection introduced by milk may also become inoculated in the tonsils and gums, and give rise to tubercular disease of the glands in the neck and under the jaw, a disease of special prevalence in childhood. The only means of avoiding the possibility of infection by milk is to boil it for at least one minute ; this destroys with certainty the tubercle bacillus.

Young children are also liable to infect themselves from their hands ; by crawling about on the floor of rooms inhabited by consumptives they collect the germs from dust and filth, and then, sucking their fingers, swallow the poison ; tubercle bacilli have been found under the nails of children under such conditions. Apart from these special dangers in early life, children may develop tuberculosis in the same way that it is developed in adults (Vol. I., p. 40), especially through the respiratory organs.

The liability to infection is enhanced by everything which depresses the body and lowers its vitality, and therefore its resistance to the microbe. Bad air, bad food, and unhealthy surroundings act in this way. Children also who are liable to constant colds and attacks of inflammation of the throat, larynx, windpipe, or the respiratory organs in general, are specially liable to infection, and it is generally acknowledged that a very large number of tubercular patients can trace their trouble to the extreme exhaustion and depression which follow attacks of the infectious fevers, more particularly measles, whooping cough, and influenza. Blows and bruises in children are known to favour indirectly the development of this disease by rendering the part more vulnerable to attack ; in this way tubercle of the spine and of the hip-joint are often originated.

ACUTE GENERALISED TUBERCULOSIS

Children are far more liable than adults to suffer from this form of poisoning by the tubercle bacillus. In almost every case the acute disease has been preceded by some local affection, such as an enlarged gland, a diseased joint, or some skin trouble caused by the bacillus. This forms a focus from which the germ is suddenly diffused throughout the whole body, and the severe symptoms of general tuberculosis are set up. These symptoms vary in different cases, and form three chief types—those affecting the whole body, and those involving chiefly the lungs or the brain membranes.

Symptoms.

The illness may commence quite suddenly, but in the majority of cases the onset is gradual and insidious. Fever sets in, slight at first, and worst of an evening ; it grows daily, rising somewhat, as in typhoid fever, to a higher point each day, until it may reach 101° or even 105°. The child appears ill, does not care to play, refuses his food, and rapidly grows thin. He is soon too ill to leave his bed, has headache, wanders in his mind, and is troubled with cough. His tongue grows white and furred, his digestion is disturbed, the bowels are loose, and the abdomen is swollen and tender to pressure. The condition now strangely resembles typhoid fever, for which, indeed, it is often mistaken. This state of things grows worse, consciousness is lost, and delirium may be severe.

Such cases are exceedingly hopeless, and death is the end in practically all ; they may be prolonged over two or three weeks, or even over five or six, but the final result is always the same. When the lungs are severely involved the course of the disease is much more rapid, and may last but a single week. Nothing can be done in our present state of knowledge to stay the disease or to mitigate its severity. The one point in treatment is preventive, for if the local starting point be recognised, which is but seldom the case, some possibility of warding off an attack exists by removing the source of infection by operation, and by careful feeding and healthy hygienic surroundings.

In certain cases, particularly in young children under two years of age, tubercle may gradually be diffused throughout the body without the severe symptoms just described and without any fever. The various organs of the body may be involved in succession—the lungs, the bowels, the abdominal organs, and the brain. The infant, wasted to a little skeleton, finally dies from exhaustion or some sudden complication, such as acute pneumonia or meningitis.

The local forms of tubercular disease in children are described elsewhere, the disorders of the lymphatic glands amongst surgical diseases, " consumptive bowels " with digestive disorders, and tubercle of the lungs with disorders of the respiratory organs.

The germ being outside the body at birth, every means should be taken to prevent its admission. The milk should be above suspicion, or should be boiled, and in the case of older children the meat must be scrutinised. A delicate child with unsatisfactory family history must be reared with the greatest care. He must be guarded against all the known sources of infection, and must not be allowed to live with tuberculous persons or in unhealthy surroundings. Even trivial ailments must be managed with care, and not allowed to continue indefinitely. Constant colds in the head and throat are particularly to be guarded against, and if the tonsils become enlarged or adenoids form they should be removed by operation without delay. Enlarged glands should be carefully watched, and if the condition is persistent they should be removed. Attacks of infectious fevers, especially measles and whooping cough, are specially dangerous, and during convalescence from such illnesses the child should be carefully watched and not allowed to return to his ordinary mode of life until even the slightest departures from a healthy condition have quite disappeared.

Preventive Treatment.

A delicate child should spend the greater part of his time in the open air, in as healthy a climate as possible, at the seaside for choice. He should live in fresh, well-aired rooms, with open windows. His food should be taken regularly, and should be very plain and nourishing, and he should be encouraged to consume fat in abundance—fat of meat, butter, eggs, milk, and cream. It is vital to maintain the nutrition of the body by good feeding, but over-feeding will only set up digestive disturbance, and provoke the onset of just those troubles which are particularly to be guarded against.

SCROFULA AND STRUMA

These terms are synonymous, and their meaning is somewhat vague. They were used to denote a tendency to low, long-continued inflammatory conditions, especially of the lymphatic glands, joints, bones, skin, and mucous membranes. This tendency is found to run in families, the members of which are said to suffer from the scrofulous or strumous constitution. It is a condition commonly met with in childhood, and children who are affected group themselves into two classes. Those in one are tall, slight, graceful, with small fine limbs, clear skins, fine silky hair, and bright intelligence; those in the other

Definition.

are short and thick-set, with coarse skins and limbs, thick features, especially thick lips, and dull, flabby aspect. The use of the term scrofula has by some been limited to the chronic enlargement of the lymphatic glands, especially in the neck, which is so common in children.

Since the discovery of the tubercle bacillus, many scrofulous disorders have been definitely proved to be due to this germ, and it has been suggested that scrofula might be used to denote a local form of tuberculosis. Others believe that scrofula is a distinct disease which in many cases precedes tuberculosis, and that its effect on the structures affected is to render them a fertile soil for the bacillus. But in point of fact, there is little occasion for the employment of these terms.

Historically, the disease thus denoted is interesting, for it was supposed to be cured by the touch of a king, and was hence termed the "king's evil." Queen Anne touched 200 persons on March 30th, 1714. There seems little doubt that in scrofulous affections the poison is not nearly so active as that found in internal organs; they are also more prolonged in their course, and more likely ultimately to get quite well. There is always, however, the danger that they may become a source of general infection, and may form the focus of an attack of general tuberculosis.

Treatment.

In connection with treatment it may be mentioned that scrofulous disorders are by many believed to act as "safety valves"; that so long as they remain sluggish and undisturbed no general infection shows itself, whilst if they disappear, or are healed, general tuberculosis follows. The probable explanation is that if these troubles are disturbed or rendered active the poison is dispersed through the system. If, however, they are entirely removed it is clear that a possible source of danger is eradicated. The proper treatment for such children is good food, cod-liver oil, and fresh air; a residence for some months at the seaside and a course of the syrup of iodide of iron. Scrofulous children should be managed with great care, and any little ailment which may cause irritation and set up inflammation—such as diseased teeth, minor injuries, patches of eczema, and slight sore throats—should be cured without delay.

RHEUMATISM

Rheumatism in children has many points of distinction from the same disease in the adult. The predisposition produced by an inherited taint is very marked, a large majority of those who suffer having a definite family history of the affection in parents or near blood relations. The tendency to it is extreme when the inheritance is derived from both parents, and the attacks are then likely to be of greater severity. Unlike what happens in adult life, the disease more frequently involves girls than boys. It is not often seen under the age of six. As in adults, the chief cause of an attack is exposure to cold and damp, but in children there is a variety of the complaint which appears in the course of an attack of scarlet fever, and cannot be distinguished from the ordinary form.

Symptoms.

The symptoms of an acute attack are similar to those exhibited in adults, with some marked differences. The high fever and soaking perspirations are conspicuous by their absence; the temperature may rise to 101° or 102°, but seldom higher, and hyperpyrexia is almost unknown. The characteristic severe pains are absent and the joint trouble is slight; there is often merely a little pain, stiffness, and tenderness in one or two joints. These are only swollen a little, or not at all, and movement is accompanied with but little suffering. Often the chief pain is not connected with the joints at all. A common symptom is a sensation of stiffness behind the knee, with some pain on movement. This causes the child to walk about on the tips of the toes, with the knee bent to avoid stretching the painful sinews. There may be stiffness of the neck, which prevents the head from being moved. An infant may cry as if hurt when moved, and be apparently unable to move one limb. Such apparently unimportant matters may be altogether overlooked, or considered to be only "growing pains," or attributed to a fall or sprain, and yet they are of great importance, as they may be but a prelude to severe internal mischief. The peculiar acid smell which is always so evident in rheumatic fever of later life is absent; the skin is moist, but not bathed in perspiration.

Children are liable to short, sharp, shooting pains in the stomach, which last for a few minutes, come on in paroxysms, and return frequently. They are started by exertion or excitement, and are not connected with disease of internal organs.

A very common symptom is rapidly developing pallor, which is sure to be noticed on account of its sudden appearance.

The real anxiety and danger of rheumatism in children is the very frequent occurrence of heart complications, and it must be looked upon as almost unusual for a child to suffer from rheumatic fever and yet recover without the heart being involved. The inflammation may affect either the lining of the heart (endocarditis), its muscular structure (myocarditis), or its covering (pericarditis), the first being the most serious, as it interferes with the valves, disturbs the circulation, and often leaves lifelong heart disease. It should be understood that these serious disorders may come on gradually with but slight fever and rheumatic pains, and thus be altogether overlooked and neglected until irreparable damage has been done. The heart complications are difficult for the unprofessional person to recognise, for they may cause but slight general symptoms. They may produce restlessness, hurried breathing, dry cough, uneasiness or pain in the heart region, and fever ; but their most definite symptoms are a change of the heart sounds, which only a skilled ear can recognise, and an alteration of the pulse, which only a skilled finger can detect. Pericarditis causes symptoms similar to those of endocarditis with greater pain and a more rapid pulse, but without involvement of the heart valves.

Children suffering from rheumatism often have skin eruptions formed of red patches, or raised spots like nettlerash. Hard nodules are sometimes met with about the joints ; they are under the skin, which is quite unaffected, and they are not painful. They are only seen in children, and are of serious import, as they are closely connected with severe forms of heart disease.

Another complication which is practically confined to rheumatism of childhood is chorea, or St. Vitus's Dance. It may appear during an attack, may precede it, or may follow it. It is distinctly rheumatic in origin, for the germ of rheumatism has been discovered in connection with it, and it is often associated with the heart complications we have described. It is an exaggerated phase of the well recognised irritable, excitable, and emotional tendencies of the nervous system which rheumatic children always exhibit.

Treatment.

It is necessary to realise the importance of most careful treatment in every case of rheumatism in children, for the symptoms being at first so slight and apparently trivial, many an attack is left unattended until heart disease has become established. The most hopeful means of preventing such serious complications is complete rest in bed for a long period. On the least suspicion, therefore, of any rheumatic affection of the joints, the child should at once be put to bed in a flannel nightdress and between the blankets. Every care should be taken to avoid chill, and all excitement or exertion must be absolutely forbidden. Rest in bed should be continued for at least a fortnight after all pain, fever, or sign of heart excitement has entirely subsided ; and the body should be kept uniformly warm through the whole illness. The diet at first should consist chiefly of milk with soda water, with small quantities of bread, biscuits, rusks, and farinaceous foods. When pain and fever have been absent for a week, broths, beef tea, soups, and custards may be added, and later still fish and chicken, butcher's meat being the last allowed. Salicylate of soda, so commonly employed for adults, is too depressing for children, and should be replaced by salicine combined with citrate of potash.

PRESCRIPTION 253

Salicine	60 grains.
Carbonate of potash	60 grains.
Tincture of orange	2 drachms.
Syrup	½ ounce.
Water to 3 ounces.	

A dessertspoonful to be given every 4 to 6 hours for a child of five years ; dose to be altered according to age.

Or the following simple alkaline mixture may be used :—

PRESCRIPTION 254

Bicarbonate of soda	3 drachms.
Syrup	½ ounce.
Peppermint water to 6 ounces.	

A tablespoonful to be given every 3 or 4 hours for a child of 8 years.

Heart complications are not suitable for domestic treatment, and the indications are too intricate to be given here with any advantage.

Heart tonics, such as digitalis and strychnia, may be required ; opium to allay restlessness and pain ; bromide of potash and chloral to induce sleep ; and stimulants—whisky or brandy—to overcome heart failure. As local treatment, the joints should be smeared with a liniment of equal quantities of extract of belladonna and glycerine, and wrapped up in cotton-wool and a flannel bandage. Later they may be painted with iodine to remove any remaining swelling.

Convalescence may be shortened by teaspoonfuls of cod-liver oil and steel wine, either separately or together. Relapses may be warded off by careful feeding, warm clothing, and avoidance of exposure to cold and damp, and of over-exertion.

CHAPTER XLVII

DISORDERS OF THE DIGESTIVE ORGANS IN CHILDREN

Hare-lip and Cleft Palate—Tongue-tie—Imperforate Anus—Prolapse of the Bowel—Hernia—Stomatitis—Thrush—Cancrum Oris—Sore Throat—Acute and Chronic Tonsillitis—Enlarged Uvula—Post-pharyngeal Abscess—Adenoids.

HARE-LIP AND CLEFT PALATE

THESE two conditions of more or less serious deformity often exist together because they arise from the same causes. In order to understand them it must be borne in mind that the child's face is developed from a number of different parts which blend together before birth to produce the natural configuration of the human countenance. Any irregularity or insufficiency of this blending together constitutes one or both of the deformities, hare-lip, so called because of its supposed resemblance to a hare's lip—an incorrect term, since the defect is always to one side and not exactly in the middle line—and cleft palate, an expression applied to cases where the two halves of the roof of the mouth do not meet, either entirely or partially, thus leaving a gap or cleft of greater or less extent. There are several degrees of hare-lip and cleft palate. For instance, there may be merely furrows or notches on the upper lip or nostril, or on the gum, or slits on one or both sides of the upper lip, or clefts in the gum running backwards; in fact, every degree of deformity may exist between these slighter forms and a terrible condition where there is a large opening in place of the upper lip—which may be said to be absent—right through into the nose, while there is no roof at all to the mouth. Sometimes these very severe deformities are associated with mental weakness.

Cause.

Many and various opinions have been put forward to explain the cause of these deformities. A very common idea is that they depend on maternal impressions, such as shocks or frights that happen at the time when the different parts which go to form the face are being developed and blended together, and which cause a stoppage of this process. It is difficult, however, to make sure that there is anything more than a coincidence in the various instances which have been brought forward to support this view. On the other hand, an hereditary tendency is certainly associated with birth deformities, usually transmitted from the paternal side, and there is very strong reason to believe that hare-lip and cleft palate occur in the descendants of parents of a previous generation who had two of the upper front teeth missing. Apart from the æsthetic aspect of the question, these deformities are important, inasmuch as many of the children affected are feeble, and are reared with difficulty, even though the disfigurement is slight, while when the deformity is very severe other serious consequences ensue. For instance, the child cannot suck properly, or the open and exposed condition of the nose and throat makes him easily liable to chronic colds and catarrh of the lungs, while even artificial feeding may be unsatisfactory and inefficient, food often returning through the nose. Thus when we consider the original feeble vitality of such children and the bad state of nutrition caused by difficulties of feeding, in addition to the risk of affections of the lungs, it is not surprising that many of them die in spite of the condition being remedied by operation. Male children are more subject to this deformity than are female.

Treatment.

Much may be done in helping the child to suck by the use of special teats for the feeding bottle, which have a kind of protector to close the opening in the palate. Should the infant be still unable to suck it should be fed while in an upright posture, so that the milk does not so easily return through the nose. When the mother has plenty of milk this should be drawn off with a breast pump and given in a warm spoon ; otherwise diluted milk must be given suitable to the age of the child, smaller quantities being administered at shorter intervals if there is vomiting. Every effort must be made to improve the infant's nutrition with a view to operation, since fatalities after surgical treatment are largely due to weakness. To this end his body and limbs should be well protected with flannel, and rubbed after the bath morning and evening with cod-liver oil.

The question of operation must be left to the surgeon, who will take into consideration whether the child's general condition is good enough to ensure union and healing of the wound, or whether operation would be useless owing to the existence of other deformities which are incompatible with life. Should the case be a favourable one for operation the question will arise—What is the best time for its performance ?

Very young children do not well stand the loss of blood and the shock, while on the other hand, when the deformity is severe, the æsthetic results of an operation are easier of attainment in a younger infant whose tissues are softer and therefore the more easily moulded into shape, to say nothing of its beneficial effects in enabling the child to take the breast or be fed in a manner most conducive to its well-being. Many of these operations are successfully undertaken during the first days of life, but some surgeons prefer not to operate before the age of one month in cases of simple hare-lip, and not before six months when there is any serious degree of cleft palate.

TONGUE-TIE

A fear of this condition is very much more common among mothers than its actual existence to such an extent as to require treatment. The little band which joins the tongue to the floor of the mouth is very rarely so short that the act of sucking is materially interfered with, while lesser degrees of this deformity are more commonly met with, but not so frequently as is popularly supposed. By placing the finger in the mouth under the tongue, it can be easily ascertained if the tip is free, and if this be the case no treatment is required. If, however, the tip is so bound down that it cannot be protruded, and especially if the act of sucking seems difficult, the aid of the surgeon must be invoked. The operation is performed by putting the frænum, the band underneath the tip of the tongue on the stretch, and snipping the edge with a blunt-pointed pair of scissors, previously boiled to ensure against danger of blood poisoning. The rest of the frænum is then torn through to the requisite extent, which should be moderate, since too free a division may lead to "tongue swallowing," a sucking back of the tongue into the throat and consequent suffocation. Inflammation has been known to occur when the operation has been carelessly performed with dirty scissors.

IMPERFORATE ANUS

This deformity is caused by a defective formation of the end of the bowel and its opening, and takes place before the birth of the child. The condition is often overlooked at first, but attention is drawn to something being wrong by the fact that the infant's bowels do not act, while aperient medicine only adds to its discomfort, causing constant crying and swelling of the belly and vomiting. If this serious state of affairs is unrelieved collapse will ensue, and the infant die of exhaustion. In the event of the baby getting no action of the bowels within twenty-four hours after birth, the orifice of the bowel should be thoroughly inspected. Sometimes it will be found that no real orifice exists, there being merely a fold of skin, which is seen to bulge when the child strains. In other cases a natural opening exists, but on inserting the little finger, well oiled, an obstruction is found a short distance up consisting of a fleshy membrane, which may be plainly felt to bulge when the child strains. In other cases, again, there may be a discharge of part of the motions through the front passage, pointing to the existence of other and more complicated internal deformities. The aid of the surgeon should be at once sought in such cases, as a timely operation may save life, but it must be borne in mind that a large number of infants in whom these deformities exist do not long survive birth.

PROLAPSE OF THE BOWEL

often occurs in children to a slight degree, and need not excite alarm, as the protrusion is generally only transitory, and after appearing once or twice completely disappears. It is met with in unhealthy and sickly children as the result of either diarrhœa or constipation or threadworms; more rarely from the presence of a stone in the bladder, a tight foreskin, or violent coughing. In slight cases a bright red ring, consisting of the lining of the gut, makes its appearance at the opening of the bowel only when the child sits on the chamber utensil and strains. In severer cases the protrusion remains, and becomes raw and excoriated, or livid and congested, with a coating of thick slime. Very often there is a certain amount of bleeding and slimy discharge, but the action of the bowels is not interfered with. When this state of affairs has persisted for some time the child's health suffers, and he loses flesh and strength, and if allowed to continue unrelieved the protrusion may become so thickened and inflamed that it is not possible to push it back again within the bowel.

To make certain that the protrusion is really due to prolapse of the bowel special attention must be paid to its ring-like shape. Other protrusions may be due to *piles*, which are very rare in infants, and never form a complete ring, or to *polypus*, which is a small fleshy growth from one side or other of the bowel, to which it is attached by a kind of stalk.

Prolapse of the bowel should be treated as soon as it is noticed, by keeping the child in bed, and regulating the bowels to prevent straining, with a powder consisting of powdered rhubarb 3 grains, bicarbonate of soda 1 grain; the protrusion should be pushed gently back whenever it comes down, and if it returns often a pad of lint smeared with vaseline should be kept over the opening of the bowel with a bandage. Usually these measures are sufficient to effect a cure, but should they fail, 2 to 4 ounces of some astringent should be injected into the bowel twice a day, preferably after an action. For this purpose infusion of quassia or decoction of oak bark may be used, and the child should be kept lying down when the bowels act, the motions being passed into a napkin. Should there be any difficulty in pushing the protrusion back, it should be pressed upon gently with a sponge, or gently squeezed with a piece of oiled lint or a pledget of absorbent wool wrung out in cold water. It is a useful plan also to put the child with its head downwards, a proceeding which overcomes resistance and facilitates the return of the protrusion. If these measures fail, medical aid should be sought, as it may be necessary to administer an anæsthetic in order to return the protrusion.

Treatment.

Since the discovery of adrenalin, a useful and powerful additional remedy has been gained in the treatment of this affection. The solution of this substance may be applied to the protrusion as a compress, while 5 to 10 drops may be given internally in a teaspoonful of sweetened water three times daily. Two injections daily may also be given containing 30 to 40 drops of the solution. Paragangline and epinephrin are somewhat similar preparations, and may be used in the same manner.

Tonics and strict attention to diet are also necessary. Cases which do not yield to these methods of treatment will have to be dealt with by surgical operation.

HERNIA

Rupture is met with in two situations in children, in the navel and in the groin, called respectively umbilical and inguinal hernia. *Umbilical hernia* may exist at birth, being of the nature of a deformity, the belly-wall, owing to an arrest of development, being imperfectly closed. In other cases the rupture appears within the first few months of life, and depends on a yielding of the scar of the navel, which has not become sufficiently firm. The protrusion is usually small, and varies in size from a small round projection to one more prominent and shaped like the top of a finger of a glove. It is usually rather above the centre of the navel than immediately through it. As a rule it gives rise to no trouble, and the bowel is never strangled ; there is no tendency for it to increase beyond moderate limits, and even if left alone it will undergo spontaneous cure in a large majority of cases.

Treatment of Umbilical Hernia.

The treatment it requires has already been described (p. 9). After two or three months the rupture is usually cured. There is a form of appliance sold which is not to be recommended. It consists of an elastic belt with a small projecting button on the inside ; this button, by pressing into the orifice, may keep it open indefinitely and prevent the cure of the hernia.

Inguinal hernia, or rupture in children, may either exist from birth or develop later at any age from straining of all kinds, especially in children who are in a feeble state of health, which makes the muscular parts of the belly-wall flabby. The most important cause of this straining is a tight foreskin of the penis ; hence the necessity for circumcision when such a condition exists. Coughing during attacks of bronchitis or whooping cough, violent crying, straining when the bowels act, from the presence of worms or of a stone in the bladder, are also to be borne in mind as calculated to produce rupture. Boys are much more frequently affected with hernia than girls, and it is sometimes associated in them with a testicle which has not descended into its bag, the scrotum, or other affections of that organ. It is also most commonly met with in feeble and puny children who suffer from disorders of digestion and constipated bowels. It is recognised by its appearance, *i.e.* a soft rounded protrusion in one or both groins, which disappears when the child is kept lying down and reappears when he cries or after he has been on his feet for some time. It can as a rule be easily replaced by gentle pressure, more especially if the child be put on his back with a pillow under the hips to raise them. Hernia in children does not become twisted or " strangulated " so frequently as in grown-up persons.

Treatment of Inguinal Hernia.

All sources of straining should be removed, *i.e.* the bowels regulated, cough assuaged, and circumcision performed if necessary. Sometimes these means alone are sufficient, but if the condition persists a truss must be provided under surgical guidance, and worn day and night, only being removed to be replaced by a rubber truss for the purpose of bathing. This must be done carefully when the child is on its back, and at a moment when he is not crying or straining, the finger being kept pressed on the part until the truss is in position. Due attention must be paid to the skin under the pad of the truss by keeping it dry and dusted with a powder containing oxide of zinc and boric acid, otherwise it will become tender and inflamed. If the rupture can be prevented from coming down for three months in an infant under twelve months of age, a permanent cure will generally be effected. In older children a longer time is required, and the truss must not be left off except on the advice of a surgeon.

Twisting or strangulation of the bowel in rupture, shown by tenderness in the part, symptoms of severe pain, and vomiting, imperatively calls for immediate surgical advice. Should the wearing of a truss fail to produce a cure after a fair trial, the question of operation must be considered, the decision of course being left to the surgeon.

STOMATITIS

This form of inflammation of the mouth is met with frequently in children, especially babies under one year of age who are teething, suffering from dyspepsia, or ill with pneumonia or other complaints. In its simple form the infant becomes irritable and feverish, the inside of the mouth is hot, swollen and congested, and frequently covered with excoriated yellowish patches having a red ring round them, called aphthæ. The mouth may be dry, or there may be increased dribbling of saliva; the child often leaves off sucking when at the breast and cries, or continually puts his fingers in his mouth. The affection lasts a few days and then subsides, the mouth remaining sore for a little longer. Sometimes epidemics of this complaint occur, affecting also older children. They have been attributed to the drinking of unboiled milk of cows suffering from foot and mouth disease.

A more severe form of this complaint is named *ulcerative stomatitis*, and affects unhealthy children between the ages of six and twelve, in association with the cutting of the permanent or second teeth. Tubercular or rickety children are most likely to suffer from it. This form of the disease commences with swelling and heat of the gums and the inside of the mouth, with foul smelling breath; the saliva then becomes increased in amount, the gums spongy and bleeding, the glands at the angle of the jaw enlarged and tender. A careful inspection of the mouth will further show that the gums usually on one side are dusky red and ulcerated, sometimes so swollen as almost to hide the teeth, which are apt to become loose and covered with a greyish pasty slime. The same conditions may afterwards spread to the inside of the cheek and lips, throat and tonsils, and in severe cases even to the jawbone. The child's health suffers severely during the attack; there is often a good deal of fever, and weakness owing to the difficulty of taking food ; most cases, however, end favourably under treatment.

Treatment.

In the simple form of inflammation of the mouth a mild purge should be given, and chlorate of potash 2 grains three times daily in a little sweetened water; later on 5 drops of the fluid extract of bark may be added. The patches may be painted with glycerine of boric acid, to 1 ounce of which 5 drops of spirits of thymol (1 in 10) have been added. Older children may use also a mouth wash of diluted Condy's Fluid, and if the ulcers are unusually slow in healing they may be touched with "lapis divinus."

In the ulcerative form scrupulous attention must be paid to the mouth, the child being made to use a mouth wash of dilute Condy's Fluid each time after taking food, and the gums being mopped with glycerine of borax to which half the quantity of tincture of myrrh has been added. Formamint tablets, which contain a powerful disinfectant called formalin, allowed to dissolve slowly in the mouth, have a marked effect in correcting the foul odour and promoting healing of the ulcers. Chlorate of potash or chlorate of soda in 5- to 10-grain doses should be given, to which tincture of steel may be added. The food in cases of stomatitis should be as nourishing as possible, but it must be at the same time bland; strong beef teas and soup extracts generally cause too much smarting. Finely pounded chicken, milk and barley water, cream, custards, and sops are the best. Change of air and tonics will be needed during convalescence, and the use of a mouth wash must be persevered in. A useful formula is:—

PRESCRIPTION 255

Thymol	3 grains.
Benzoic acid	40 grains.
Tincture of eucalyptus . . .	3 drachms.
Essence of peppermint . . .	10 drops.

Rectified spirit to 3 ounces.

"The mouth wash." Half a teaspoonful to a tumblerful of warm water.

THRUSH

Is a parasitic inflammation due to the presence and growth in the lining membrane of the mouth of a species of fungus called *Oidium albicans.*

It usually comes on in infants of a few months old whose mouths are in an unhealthy condition or who are suffering from some form of wasting disease, or appears as a complication at the end of some chronic illness, or in the last days of pneumonia, meningitis, or typhoid. Children who are quite healthy are rarely attacked, as the complaint seldom appears as an independent affection. It commences with the appearance of small whitish spots on the inside of the cheeks and on the tongue and palate; often there is a red ring round each. There may be but a few scattered spots, or a great number of them, or they may run together into patches covering large portions of the tongue and cheek. The spots and patches cling to the mucous membrane, and cannot easily be removed; this fact serves to distinguish them from flakes of milk, which they somewhat resemble. People often talk of thrush "going through" a child, but there is no real ground for assuming that it does so, although the fungus has occasionally been found in the larynx, gullet and stomach. The probable explanation of this popular belief is that a child suffering from thrush is very likely at the same time to be affected with some form of stomach or bowel disorder which produces a red, irritable and even excoriated state of the orifice of the bowel.

Symptoms.

In weakly infants especial care must be taken to cleanse the teat and bottles, which should be kept in water containing a little bicarbonate of soda tinged with Condy's Fluid, as the fungus grows most readily when an acid is present. The child's mouth should also be cleansed, after taking the breast or the bottle, with the same solution. As soon as symptoms of thrush develop the child's mouth should be brushed out after each feed with a solution of sulphite of soda, 1 drachm to the ounce, and then glycerine of borax applied. If this does not effect a speedy improvement stronger applications may be used, such as solution of carbolic acid, 2 grains to the ounce, or of sulphate of copper of the same strength. Unless hygienic measures be judiciously carried out local treatment will be of little avail. Nourishment should be chosen with care, the bowels regulated with magnesia, dyspepsia relieved, and the child should be much in the open air.

Treatment.

CANCRUM ORIS

This most dangerous and very often fatal affection presents, from the commencement, very different characters from those of the other forms of stomatitis, and is primarily and essentially distinct from the severe ulcerative terminations of the other kinds of inflammation of the mouth. The causes of this complaint are to be found in some pre-existent debility: depression of the vital power as by insufficient food, or exhaustion by previous disease, especially one of the eruptive fevers. Low, cold, and humid apartments such as cellars are not unfrequently concurrent causes. It occurs most frequently in children between the ages of two and nine.

Symptoms.

The symptoms commonly begin as a swelling and hardness of one cheek or lip, without marked increase of heat or redness, and without much tenderness or pain, even on examination. Owing to the absence of acute or active symptoms at the commencement the disease is often overlooked at first or until it has made dangerous progress. The outside skin of the cheek has a waxy or glossy appearance, while on the inside of the swollen part an ash-coloured slough of small size may be detected. There are various degrees of weakness and exhaustion, with languor and fretfulness. The pulse is generally small, soft and quick, but there is not much increase of temperature except in the evenings. As the disease advances, the slough on the inside of the cheek spreads and may extend to the lips and gums. The breath becomes very offensive. The outside of the cheek now becomes invaded by the gangrenous process, a pale ashy spot appears in this situation, and soon becomes livid and dies. In severe cases the cheek is perforated, while the lower lip, the angle of the mouth, and the gums are not unfrequently destroyed. The teeth often fall out, and the bones of the face may become affected. As the malady proceeds locally, symptoms of gradually increasing vital depression caused by poisoning from the foul oozing ensue, and death may result from either exhaustion or septic pneumonia. Sometimes the process comes to an end or is arrested by active surgical treatment, leaving, however, considerable deformity.

Treatment.

Prompt and decided measures are needed for this form of stomatitis. The nourishment must be abundant and stimulation free, about 3 to 4 ounces of brandy per day for a child of five years, in egg and milk. Locally the actual cautery or pure nitric acid constitutes the best form of treatment, which must be applied by a skilled surgeon.

SORE THROAT

This affection is of very frequent occurrence in children, and an examination of the throat should always be made as a matter of routine whenever a child is feverish or looks ill; the fact that young children do not often complain of soreness in swallowing often results in some grave disease such as tonsillitis, scarlet fever, or diphtheria being overlooked. Children are subject to relaxed sore throat if they catch cold; the symptoms are slight, but there is an irritable cough. A few red gum lozenges will correct this condition.

ACUTE TONSILLITIS

The tonsils are very liable to become acutely inflamed in children, probably because they stand as barriers at the entrance of the throat and intercept the germs in the inhaled air; hence they are constantly affected in scarlet fever, diphtheria, measles, German measles, and rheumatic fever. Other cases are due to catching cold, inhaling bad smells, drinking impure milk, and epidemics of acute tonsillitis occur frequently in schools.

Symptoms.

The symptoms are ushered in with chills and shivering, followed by heated skin, excited pulse, thirst and headache. There is usually no vomiting, which serves in some measure to distinguish ordinary tonsillitis from scarlet fever. Rapidly following this there is a sensation as if a foreign body were present in the throat, the child making continual efforts at swallowing, which may become difficult and painful. When the patient's mouth is opened, and the tongue depressed, the tonsils are seen to be more or less congested and swollen, protruding from between the pillars of the palate. Their surface may merely be red and spongy-looking, or covered with yellowish spots, which are due to thick secretion retained in the little hollows on the surface, and are not really "ulcers," as they are commonly called (hence the popular name *ulcerated sore throat*). The spots may join together and form patches of yellow, which can be detached with a brush and do not spread to the uvula or palate. These two points serve to distinguish them from *diphtheritic* membrane. The glands at the angle of the jaw often become enlarged and painful, and fever is usually high, 103° or more, but after a few days all the symptoms tend to abate, and the temperature gradually returns to normal.

All cases should be isolated at first, as they are often infectious, and may turn out to be scarlet fever or diphtheria. It is the usual practice to "take a swabbing," that is, to collect some of the secretion on a specially prepared instrument and to have it subjected to expert investigation, in order to get more precise information as to the nature of the attack.

Treatment.

The diet must be liquid or soft, pain can be relieved by painting glycerine of belladonna on the neck and covering with a hot fomentation. If practicable the tonsils should be painted with a solution of boroglyceride, 1 in 12, or older children who can gargle may use a saturated solution of boric acid diluted with an equal amount of warm water. Formamint tablets should be given to suck. The following medicine should be administered :—

PRESCRIPTION 256

Citrate of potash	1 to 2 drachms.
Solution of citrate of ammonia . .	4 to 6 drachms.
Syrup of orange	½ ounce.
Water to 3 ounces.	

A dessertspoonful to be given every 3 hours.

To each dose of this mixture 5 to 10 grains of salicylate of soda may be added in rheumatic cases.

During convalescence the following mixture may be used with advantage :—

PRESCRIPTION 257

Dilute nitro-muriatic acid . . .	1 drachm.
Elixir of cinchona	6 drachms.
Chloroform-water to 3 ounces.	

A dessertspoonful to be given 3 times a day.

CHRONIC TONSILLITIS

Enlarged tonsils may be the result of an acute attack or of repeated attacks, or may develop without any such apparent cause, probably in connection with enlargement of other glands, since the affection is almost always associated with adenoids. In this disorder of childhood there is an overgrowth of the tonsils, which become pale, enlarged, and project until they almost meet in the middle line. Such a condition renders children more liable to attacks of acute tonsillitis, the discomfort and pain of which are proportionately increased, while they all develop a peculiar characteristic appearance and suffer from the same train of symptoms. Their aspect is dull and vacant, the mouth is kept open, the growth stunted. Sleep is restless, with noisy breathing; sometimes wetting the bed occurs. The patients suffer continually from colds, and earache, and are often rather deaf, and speak with a thick nasal voice.

Little can be done except by way of removal of the enlarged organs by a surgeon. Operation also has this advantage, that adenoids can be dealt with at the same time. In slight cases some benefit may be derived from residence at the seaside, the administration of cod-liver oil with syrup of iodide of iron, and painting the tonsils daily with one of the following paints:—

Treatment.

PRESCRIPTION 258

Iodine	6 grains.
Iodide of potash	12 grains.
Oil of peppermint	10 drops.
Glycerine to 1 ounce.	

or

PRESCRIPTION 259

Carbolic acid	15 grains.
Glycerine of tannin	1 ounce.

A gargle of solution of resorcin, 1 in 200, may also be used morning and evening.

ENLARGED UVULA

This little structure which hangs down in the centre from the soft palate may become inflamed in the various forms of sore throat and tonsillitis. When it is chronically enlarged it may hang down to such an extent that a dry, irritable cough is caused. In this case it may be painted with glycerine of tannin, or snipped off.

POST-PHARYNGEAL ABSCESS

Abscess at the back of the throat may be due to disease of the spine, high up in the neck, or of the glands in connection therewith; it may also occur from injury to or inflammation of the throat, and during an attack of scarlet fever. The symptoms are rather like those of croup, with difficulty of breathing and of swallowing, pain and dribbling of saliva. When the throat is looked at an inflamed projection is seen at the back. The abscess may burst by itself, but surgical aid must always be sought, as the abscess may burrow if not opened, and sometimes the obstruction to breathing is so great as to render the operation of tracheotomy necessary.

ADENOIDS

At the back of the soft palate, between it and the nose, is an organ called the pharyngeal tonsil. An enlargement or overgrowth of this structure constitutes the adenoid growths so common in children. Their significance and proper treatment were not known to medical men until comparatively recent years. These growths occur at any age, even in the youngest infants, and their presence should be suspected whenever enlarged tonsils are found, and the symptoms described under the heading of chronic tonsillitis are present. Their presence is almost a certainty if those symptoms exist with a trifling amount of tonsillar enlargement. To make certain that the child is suffering from adenoids, a finger must be passed into the mouth to the back of the throat and turned up behind the soft palate ; wart-like masses will then be felt which sometimes completely block up the back opening of the nose, but sometimes are limited in extent to a mere velvety condition of the parts. This condition is often associated with a narrow and high roof to the mouth, with irregularity and crowding together of the teeth. The expression acquires a characteristic pinched and stupid look, the nose is narrow, the chest often pigeon breasted. If left untreated adenoids either remain stationary or tend to increase, but some French physicians are of opinion that in girls they sometimes subside when menstruation becomes established. Some authorities also state that considerable improvement will follow a carefully devised series of breathing exercises perseveringly carried out for a prolonged period. No doubt a very slight degree of adenoid growth may be prevented from increasing by such methods, but in cases of any magnitude, with marked symptoms and repeated attacks of cold, operation should decidedly be performed.

CHAPTER XLVIII

DISORDERS OF THE DIGESTIVE ORGANS IN CHILDREN (*concluded*)

Indigestion and Dyspepsia—Colic—Vomiting—Constipation—Diarrhœa—Infantile Cholera—Gastritis—Acute Catarrh of the Bowels—Chronic Catarrh of the Bowels (Atrophy of the Bowels)—Consumption of the Bowels—Tubercular Peritonitis—Intussusception.

INDIGESTION

This condition is not a disease, but a disturbance of the normal bodily functions, very common in children from the earliest age. The term indigestion is usually applied to attacks of difficult digestion of an acute form or of accidental nature, while for more lasting conditions the term dyspepsia is used. Such troubles in infancy have already been dealt with (Chap. XLV.). In older children acute indigestion is very common, and is almost always the result of unsuitable or excessive feeding; it is especially seen in children whose appetite is in excess of their digestive powers, and who bolt their food without proper mastication. Occasionally some little upset, exposure to cold, or too violent exercise precipitates an attack.

Symptoms.

In these circumstances, a few hours after taking food a sense of general discomfort comes on, with oppression and pain at the pit of the stomach, which is swollen and perhaps tender; sometimes regurgitation of sour or offensive material takes place. There are often intense headache and drowsiness, and even convulsions may occur. The little patient complains of feeling sick, and sometimes at this point vomiting supervenes, at first painful and alternating with ineffectual retching, then becoming free and containing at the last little more than bile-stained mucus, which burns the child's throat and emits a pungent acrid smell. After emptying the stomach the child often falls asleep and wakes comparatively well, but a certain amount of diarrhœa may supervene owing to the stomach having passed on part of its undigested contents into the intestines, producing colicky pains, rumblings, and irritating motions, in which remains of food are often easily recognisable.

These attacks are sometimes so sudden and acute as to cause great alarm among inexperienced mothers and nurses, and on the other hand the comparative impunity with which they may be repeated fosters a contempt and indifference which are by no means desirable, since by this means the foundations of chronic catarrh of the stomach and intestines may be laid.

Treatment.

The best treatment is to imitate Nature's methods and encourage vomiting and free action of the bowels. A dose of castor oil is a safe remedy, since it acts as an aperient and is less irritating than most purgatives; while, should it be rejected, it still helps to clear the stomach and enough probably remains to produce some aperient effect. Should there be great distension of the stomach without vomiting an emetic will afford prompt relief. Five grains of powdered ipecacuanha may be given to young children, and repeated in ten minutes; 10 grains may be given to older children and repeated in a quarter of an hour. After the stomach has been cleared ½ or 1 grain of calomel according to age may be given, and this simple sedative mixture:—

PRESCRIPTION 260

Bicarbonate of soda	36 grains.
Carbonate of magnesia . . .	36 grains.
Syrup of ginger	1 drachm.
Dill-water to 1½ ounces.	

A teaspoonful to be given every 4 hours. For an infant under 1 year. Double the quantity for older children.

Symptoms.

In children the subjects of scrofula, rickets, anæmia, debility, difficult teething, and a certain family predisposition, dyspepsia is common and is especially fostered by insufficient mastication, habitual over-eating, and indigestible food. Symptoms are very variable both in degree and in kind, and consist of distension of the stomach and tenderness on pressure, colicky pains, eructations, and vomiting. The motions may be frequent and consist largely of undigested milk or other articles of diet, or on the other hand there may be troublesome constipation; the appetite may be voracious or poor and capricious. The little patients become feeble, anæmic, listless, and thin, they are often irritable and fractious, their sleep is disturbed by nightmares and attacks of screaming, and there is frequently some feverishness at night.

Medicines will prove useless unless due attention is paid to proper

Treatment.

feeding. Habits of bolting the food must be corrected, and the consumption of unsuitable articles of diet, so much fancied by some children, strictly forbidden. Exercise in the open air, regularity of meals and wholesome food are essential. Certain symptoms call for special remedies for their relief ; one of the most important of these is flatulence. In the case of young children, one or two teaspoonfuls of equal parts of lime-water and dill-water will help to "disperse the wind," while the following mixture may be given :—

PRESCRIPTION 261

Citrate of soda	36 grains.
Syrup of rhubarb	2 drachms.
Spirits of chloroform . . .	12 drops.
Caraway-water to 1½ ounces.	

A teaspoonful to be given every 3 or 4 hours.

If there is much pain the addition of 10 minims of tincture of henbane will prove a useful sedative. At the same time the feeding must be restricted. Should much colic accompany the flatulence, hot fomentations should be applied to the abdomen, and an injection of 10 to 15 ounces of warm water given.

COLIC

Causes.

Stomach ache is a common trouble in children. It is generally the result of improper feeding. The child takes its food either too quickly or in too large quantities, and the digestion is carried on imperfectly. The result is that fermentation of the food takes place, and the bowels become distended with large quantities of gas, setting up an attack of the "gripes." Again, colic may be caused by unsuitable food.

Symptoms.

A child suffering from colic and flatulence has a distended abdomen, is restless, tosses about, and cannot go to sleep ; he cries constantly as if in pain, has a pained expression ; the face may be bluish, the mouth and eyes twitch, the extremities grow cold, and the legs are constantly drawn up to the abdomen. If wind is passed or brought up he seems to experience instant relief.

Treatment.

An infant may be relieved by placing him over the shoulder and gently rubbing his back or laying him across the knee on his stomach. The amount of food should also be temporarily reduced, a little sweetened barley-water or some whey taking the place of the next meal. Or the next meal may be postponed for a time so as to give the stomach a rest. In bottle-fed babies the milk should be more diluted with barley-water or lime-water. Relief for the time may be obtained by giving half a teaspoonful of dill-water with two teaspoonfuls of hot water or a dessertspoonful of equal quantities of lime-water and cinnamon-water, or part of a soda-mint tablet dissolved in water. The bowels should be cleared with a 1-grain powder of mercury and chalk, or by an enema of warm water. Hot fomentations to the abdomen also aid in dispersing the wind.

VOMITING

In young children this trouble may often be checked by citrate of soda; before each feed a tablespoonful of the following solution is to be given:—

PRESCRIPTION 262

Citrate of soda, freshly prepared .	40 grains.
Simple syrup	3 drachms.
Distilled water to 4 ounces.	

Very often this succeeds without making any alteration in the milk, but if not the food may be diluted and peptonised. As vomiting is caused by the presence of curdy masses in the infant's stomach a useful plan is to precipitate the curd in the milk by means of pegnine, a powder prepared from rennet, before using it for the child's food. Pegnine causes a very fine flocculent curdling of the milk; the fine curds are then dispersed by vigorous shaking; the milk may be warmed and diluted if necessary. A mixture containing bismuth is of service, such as the following, from the Children's Hospital Pharmacopœia:—

PRESCRIPTION 263

Carbonate of bismuth . . .	36 grains.
Bicarbonate of soda	24 grains.
Compound tragacanth powder . .	10 grains.
Spirits of chloroform	16 drops.
Caraway-water to 1½ ounces.	

A teaspoonful to be given every 3 or 4 hours. For a child 1 year old.

Occasionally vomiting will cease after the child's stomach has been washed out with a weak alkaline solution, which gets rid of the acid slime and decomposing curd. The dyspepsia of older children is often improved by giving a mineral acid after meals, such as dilute hydrochloric acid, from 1½ to 3 minims, according to age, in one or two teaspoonfuls of sweetened water.

Though the most frequent cause of vomiting is indigestion, dyspepsia and bad feeding, those having the care of children must be on their guard against thinking that that is the only cause. It may also be due to some congenital obstruction of the bowels, or to the twisting of the bowel in a rupture (hernia). Or it may have nothing to do with disorders of the stomach or bowels, but be purely nervous and due to some disease of the brain, or to the irritation of cutting teeth. In tubercular meningitis, again, vomiting is a very early symptom, and may precede by some days any others referring to the brain. Vomiting is also one of the first symptoms of scarlet fever and influenza, and lastly it may occur in hysterical conditions in girls about the age of puberty.

CONSTIPATION

May occur at all ages during childhood, and may be either temporary or habitual. It may be due to constitutional tendency or weakness, such as rickets, and is more common in children brought up on the bottle, though it is also met with in infants at the breast, probably due to the mother's milk being too rich in curd, undigested masses of which are seen in the motions.

Cause.

Quite young children suffering from constipation, instead of passing two or three semi-liquid orange coloured motions daily, have perhaps only one action in the twenty-four hours, or even one every two or three days, the stools being hard, pale and dry, sometimes streaked with blood from excoriation of the orifice of the bowel, and expelled with straining and difficulty. This state of affairs does not as a rule lead to any very serious results, and does not interfere with the child's development, nor cause it much discomfort, but it may on the other hand tend to the production of hernia (rupture) and prolapse of the bowel. There is rarely much distension of the belly or general deterioration of health, or vomiting.

Symptoms.

In older children constipation may be set up in those who take too little exercise, or pore over their lessons, who eat too much animal food or neglect the habit of going to the closet daily. A nervous temperament predisposes to it, and it is not rare to find it in hysterical young girls. If the condition is allowed to go on unrelieved it may engender, in some cases, but by no means inevitably, loss of appetite, enlargement of the belly, nausea, vomiting, and all the symptoms of gastric catarrh, nose bleeding, headache, giddiness and feverishness.

Treatment.

In infants at the breast the mother or nurse may be advised to drink Vichy water, and take plenty of green vegetables and fruit. Bottle-fed babies should have their food prepared with oatmeal-water instead of barley-water, or a small quantity of Mellin's Food may be added to each bottle, or a small piece of manna, or a pinch of phosphate of soda. Massage to the abdomen is useful as an accessory. To ensure an action of the bowels recourse must be had to suppositories, to injections or to laxatives. Suppositories should be tried first, and are generally successful in all but obstinate cases; they are composed either of soap, or cocoa butter, or glycerine jelly; sometimes even inserting the little finger, dipped in glycerine, into the orifice is sufficient. Injections may be of olive oil, of glycerine and water, or of plain water, which should be cold, since warm injections after a little time cease to act and become useless. If these measures fail laxatives must be used. A small dose of calomel, ¼ to ½ grain, administered for a few days, is often followed by a more lasting improvement. Those drugs should be chosen which are the least likely to lose their effect, or which combine some tonic properties with those of a laxative nature. The following prescriptions will be found useful:—

PRESCRIPTION 264

Aromatic liquid extract of cascara (Stearn's)	1 drachm.
Tincture of belladonna	1 drachm.
Simple elixir	2 drachm.
Water to 1½ ounces.	

A teaspoonful to be given at bed-time.

PRESCRIPTION 265

Carbonate of magnesia	6 drachms
Sulphate of soda	3 drachms
Aromatic extract of cascara (Stearn's)	3 drachms
Spirit of chloroform	1½ drachms
Distilled water to 6 ounces.	

One or 2 teaspoonfuls twice a day after meals.

PRESCRIPTION 266

Carbonate of magnesia	6 drachms.
Glycerine	6 drachms.

Water to 6 ounces.

Two to 4 teaspoonfuls to be given occasionally.

Or laxative medicines may be combined with tonics, as in the following mixtures :—

PRESCRIPTION 267

Tincture of nux vomica	6 minims.
Tincture of belladonna	1 drachm.
Infusion of senna	½ ounce.

Infusion of calumba to 1½ ounces.

A teaspoonful to be given 3 times a day before food.

PRESCRIPTION 268

Sulphate of soda	2 drachms.
Sulphate of quinine	3 grains.
Aromatic sulphuric acid	12 minims.
Tincture of nux vomica	6 minims.

Water to 1½ ounces.

A teaspoonful to be given 3 times a day before food.

PRESCRIPTION 269

Tincture of euonymin and pepsin	3 to 4 drachms.

Chloroform-water to 3 ounces.

A dessertspoonful to be given 3 times a day.

In older children the treatment must be on nearly the same lines as for constipation in the grown up. Oatmeal, green vegetables, stewed fruit, oranges and figs should form part of the diet ; sponging with cold water, and exercise in the open air should be enjoined. Children will take natural aperient waters or half a seidlitz powder or " Tamar Indien," or sugar-coated tabloids of compound cascara. A course of aloes is useful under medical advice, 1-grain pills of Barbadoes aloes being given three times a day, sometimes as many as three for a dose. The amount is gradually lessened as the bowels act more readily, until at length perhaps only one pill is needed twice a week.

Podophyllin is a useful drug when the motions are dry and whitish. Palatinoids can be obtained containing podophyllin ¼ grain, euonymin ¼ grain, extract of cascara 1 grain ; they may be given once or twice a day to a child between six and twelve years of age.

When anæmia is present iron combined with an aperient is indicated, as in

PRESCRIPTION 270

Sulphate of iron	6 grains.
Sulphate of magnesia	1½ ounces.
Aromatic sulphuric acid	12 drops.
Spirits of chloroform	1 drachm.
Water to 6 ounces.	

One tablespoonful to be given twice or thrice daily before meals for a child of 10 to 12 years of age.

DIARRHŒA

Causes.

The number of disorders in which diarrhœa occurs is very considerable. Many bowel complaints are much more common during childhood than in later life ; excess of mucous and acid secretions, chronic inflammation of the large bowel, and infantile cholera are the special proclivities of early childhood. The reason for this is to be found in the changes accompanying the rapid development of the child, and the various hygienic conditions incidental to early age, such as changes in food, in clothing, and in habits of life. Thus it happens that diarrhœa accompanies the commencement of an attack of scarlet fever, or occurs during the course of blood poisoning, kidney disease, peritonitis, consumptive bowels, and typhoid fever. It is also frequent in rickety children, and after whooping cough and measles. When not associated with these conditions the most common cause of simple diarrhœa is some fault in the alimentation of the child. It may be that the mother's milk, even though it seems normal, does not agree with the baby, or it may be too poor or too rich, or altered in some way, by strong emotions, insanitary conditions, or nervous, irritable temperament on the part of the mother. In bottle-fed babies, the curd of cow's milk is digested with difficulty, and becomes decomposed in the bowels, causing irritation and catarrh, so that the infant becomes peevish and restless, draws up the legs in pain and begins to pass frequent motions which, instead of being of a uniform bright yellow colour, are flaky, slimy and green. The little patient becomes thin and flabby, the buttocks and orifice of the bowel raw and red ; he suffers from thirst as shown by the avidity with which he takes the bottle, and frequently inflammation develops in his mouth. The attack may pass off in a few days, or may develop into a chronic condition, or may set up a catarrh of the large bowel, with symptoms like those of dysentery, the motions becoming more slimy, containing bile and blood, and causing a great deal of straining, with prolapse of the bowel. In older children the motions may consist almost entirely of undigested food, showing that the process of digestion is suspended to a large extent. At other times they may consist almost entirely of fat. In very severe attacks brain symptoms may come on, being more frequently met with the younger the child. In some cases there are convulsions, in others the child falls into a drowsy state, with pinched features, and signs of collapse. Epidemics of simple diarrhœa occur, both in summer and winter, but much more frequently in the former.

Treatment.

It is advisable at the outset, as soon as the child shows signs of looseness of the bowels, to give a dose of castor oil or calomel with the object of clearing away undigested and decomposing curds of milk; by this means a definite attack of diarrhœa may often be averted. When the attack is developed, and if there be much pain, an emulsion of castor oil and bismuth, to which some sedative can be added, is useful. For example:—

PRESCRIPTION 271

Castor oil	2 drachms.
Solution of citrate of bismuth	2 drachms.
Powdered gum arabic	36 grains.
White sugar	36 grains.
Compound cinnamon powder	36 grains.

Chloroform water to 1½ ounces.
A teaspoonful to be given every 2 or 3 hours.

For a sedative add tincture of henbane, 10 minims to each dose. After twenty-four to thirty-six hours an astringent mixture should be given, such as

PRESCRIPTION 272

Tannigen	60 grains.
Solution of citrate of bismuth	½ ounce.
Compound tincture of camphor	12 drops.
Spirit of chloroform	24 drops.

Dill water or cinnamon water to 1½ ounces.
A teaspoonful to be given every 4 hours.

When the infant begins to pass less liquid stools and with less frequency, the following acid mixture will restore tone to the irritable bowels:—

PRESCRIPTION 273

Dilute nitric acid	12 drops.
Solution of pepsin	½ ounce.
Spirit of chloroform	12 drops.

Water to 1½ ounces.
A teaspoonful to be given 3 times daily.

Diet.

It is all important to change the ordinary diet in these cases by way of lessening its quantity, and diluting it. Breast-fed babies may be given feeds of sweetened barley water instead of putting them to the breast every alternate feed. Bottle-fed infants should have their milk well diluted, or a mixture of cream and barley water instead. When there is vomiting, or when masses of undigested curd are seen in the motions, the milk may be peptonised by means of Fairchild's peptonising powders, or the curd may be thrown down and shaken up by means of the pegnine powder (p. 64). In severer cases still the curd may be strained off after the milk has been treated with pegnine, and the resulting whey mixed with an equal quantity of arrowroot water, and sweetened. Or ½ ounce of white of egg may be shaken up with 10 ounces of barley water and sweetened, and given by bottle every few hours, and in quantities suitable to the age of the child. Again, veal broth or chicken broth may be wholly or partially substituted for milk food. Should there be much collapse, brandy should be given in 5-minim doses in water every two hours.

CHOLERAIC DIARRHŒA

Cause.

This dangerous complaint (also called zymotic diarrhœa and infantile cholera) occurs in epidemics during the hot weather of the autumn, most often during August and September. It does not occur in winter, and is rare in the spring, but that it is not caused by hot weather alone is shown by the fact that babies at the breast are rarely attacked. It is especially frequent in children between four and twenty months old, which corresponds to the period of teething, but it is not to be inferred from this that teething is the direct cause of the affection, but only that it predisposes to it. Boys seem rather more often attacked than girls, especially when badly fed, either with bottles of stale milk or with indigestible food. It must also be noted that those who contract this malady are often puny, delicate, ill-nourished, and subject to disorders of the stomach and bowels. The poorer classes furnish the largest contingent of cases owing to their unhealthy dwellings, bad food, and the neglect of cleanliness in its preparation, while in the well-to-do classes of society it is comparatively rare. It is often stated that this complaint is caused by eating unripe fruit, or drinking sour milk, or breathing sewer gas; but epidemics are too widespread to be due to these causes, and ordinary soured milk is not productive of diarrhœa, indeed it is often prescribed medically. There is, however, strong reason to believe that certain germs are present in the air, derived from the excrement of cows, from hayseeds, or from the dust of streets, and that these germs, having gained access to milk, develop in it rapidly under the favouring influence of hot weather. Although no distinct germ of this kind has been detected in milk, it is highly probable that the affection is dependent on some such cause as this.

Symptoms.

The onset of the complaint occurs sometimes in the midst of apparent health, but more often in children who for some weeks have suffered from stomachic and digestive disorders. It begins suddenly with incessant vomiting, at first of food and then of watery substance, provoked whenever the child drinks. He is rarely bilious, for the secretion of bile is stopped in this disease. At the same time there are frequent and copious motions, which are watery and almost colourless. Sometimes vomiting is absent, there being only diarrhœa. The belly shows nothing in particular, being hardly tender, thirst is intense, the tongue moist and slightly coated, the pulse quick, but the fever moderate. The child looks worn, with sunken eyes, is restless and irritable, and sometimes cries out with pain, drawing up the legs at the same time. As the disease advances the expression becomes profoundly changed, the face is pinched and ashy, the eyes are deeply sunken and partly closed, the nose is thin, and the muscles are wasted. The thirst becomes insatiable, the urine is scanty, the nose and extremities cold and livid—even the tongue becomes cold; drowsiness and listlessness replace the former restlessness, the prostration is extreme, the little sufferer giving hardly any sign of consciousness, the belly becomes flabby and sunken, and can be pinched up like a sheet. The vomiting may cease at this stage, but the diarrhœa continues, especially if the disease is about to end fatally; quick breathing, collapse, and sometimes convulsions precede death. In other cases a reaction takes place, the vomiting first ceases, then the diarrhœa, colour returns to the child's face, he begins to take notice, the thirst disappears later. It is not easy to estimate the exact duration of the malady; fatal cases are the shortest—about seven to ten days—especially those occurring in very young infants, which are almost as rapidly fatal as Asiatic cholera. In cases which recover, it is two to three weeks before the child's health is re-established, and many succumb later to chronic disease of the bowels and wasting; some children become anæmic and dropsical.

Treatment.

Extreme care must be taken during the hot weather to obtain pure milk and to keep it in such a manner that it does not easily become contaminated by germs present in the air; it should also be sterilised before being used. Infants at the breast should not be weaned during the hot months, and children should be very carefully fed during this season, with a view to avoiding any irritation of the bowels from excess of food or undigested milk. The moment any looseness of bowels makes its appearance the food should be at once lessened in amount. If possible, children should be removed from towns during the hot weather and taken to the seaside or some elevated country place.

As soon as symptoms commence, all milk and milky foods must be stopped and barley-water or egg water given instead (see Diarrhœa, p. 70). Mustard fomentations should be applied to the stomach and a dose of castor oil given, either by itself in doses of half to one teaspoonful, or in an emulsion combined with some antiseptic, such as the following mixture:—

PRESCRIPTION 274

Castor oil	3 drachms.
Salicylate of soda	12 grains.
White sugar	10 grains.
Powdered gum arabic . . .	10 grains.
Syrup of ginger.	1 drachm.

Peppermint water to 1½ ounces.
One teaspoonful to be given every 2 hours.

When there is much sickness, small doses of calomel are to be preferred—*i.e.* ¼ to ½ grain every two hours until 1 to 2 grains have been taken. The object of these measures is to remove as much undigested food as possible from the stomach and bowels. The same effect may also be obtained by washing out the child's stomach with a warm solution of borax—2 per cent.—which, of course, can only be done by a doctor. When the stools have become free from undigested curd, etc., our efforts must be directed to checking the vomiting and diarrhœa. For the former purpose carbolic acid, which is a direct stomach sedative, is perhaps the most useful drug, and should be given in 1-minim doses of glycerine of carbolic acid in a teaspoonful of water every two hours. Bismuth may be given for the same purpose, as in this mixture ;—

PRESCRIPTION 275

Salicylate of bismuth	12 grains.
Aromatic spirits of ammonia . .	25 drops.
Compound tragacanth powder . .	12 grains.
Spirits of chloroform	12 drops.
Dilute peppermint water to 1½ ounces.	

One teaspoonful to be given every 3 hours.

In order to check the putrefactive action going on in the stomach and bowels, and to prevent the formation of poisonous substances which tend to cause the collapse and prostration, many authorities recommend salol in 1-grain doses, benzo-naphthol in 2-grain doses, or resorcin in ½- to 2-grain doses. To check the diarrhœa in this stage, oxide of zinc is useful in 2- or 3-grain doses, or the tannigen mixture given under Diarrhœa (p. 69). Opium must be used with caution, and is best given in the form of an injection. Laudanum, 2 to 5 drops, in some warm starch-water, may be injected into the bowel of an infant of between six and twelve months. One or two injections may be given in the course of each twenty-four hours, and the effect carefully watched. They are useful in soothing the patient, and also act locally in diminishing the straining. All opiates in the early stages do harm by causing the retention of undigested and putrefying food and curd, and should at no time be given without medical advice. For the collapse and prostration stimulants are required, and warmth must be restored to the surface of the body by mustard baths. When the attack is over, extreme care must be exercised with regard to diet, no milk being allowed ; starchy food, meat juice and meat broths, whey, buttermilk, and plasmon may be given. The mineral acids with pepsin wine are useful in restoring tone to the digestive system, which remains impaired for many weeks even after convalescence is established.

GASTRITIS AND GASTRO-ENTERITIS

Gastritis, or inflammation of the stomach in an acute form, occurring in children, is usually due to some error in diet (*see* Acute Indigestion, p. 61), or points with less probability to the beginning of one of the eruptive fevers, especially scarlet fever and influenza ; or, again, it may be the commencement of infantile cholera ; much more rarely it is due to a chill.

A combination of inflammation of the intestines and stomach (gastro-enteritis) is usually due to ptomaine poisoning, occasioned by certain articles of food which contain some virulent poison, such as bad milk, tinned meat, sausages, pies, mushrooms, and shellfish. The symptoms are vomiting and diarrhœa, with pain in the belly, fever and tendency to collapse. Usually several members of a family are attacked, a fact which points to the probable cause. The treatment is the same as for choleraic diarrhœa (p. 70).

ACUTE CATARRH OF THE BOWELS

Symptoms.

This is one of the most frequent of children's complaints, especially during the first three years of life, being associated with teething, premature weaning, hot weather, and bad feeding. Exposure to cold and a family tendency also play an important part in its production, and it not unfrequently follows measles and whooping-cough. In very young children it takes the form of diarrhœa of rather a mild form ; vomiting is rare, the tongue is moist, and the appetite is capricious, but not lost. The motions occur several times in the twenty-four hours, perhaps with colicky pains, and consist of yellow or greenish mucus or slime mixed with a certain quantity of undigested food. The little sufferers are flabby, with pale faces and sunken eyes ; there is generally no fever. Sometimes the onset is more acute, with thirst and considerable pain, peevishness, quick pulse, and some rise of temperature. In whatever way, however, the trouble commences, the symptoms, especially the diarrhœa, persist for one or two weeks, sometimes for a month, the more violent cases being the shorter. The complaint usually ends in restoration to health, the motions become less in number and more solid in substance, appetite becomes healthier, colour returns, and convalescence is established. The disease, however, does not always end so satisfactorily, but may merge into a chronic diarrhœa, with wasting (p. 75). The more acute cases have to be distinguished from typhoid fever, which they somewhat resemble for the first few days ; the points to be taken into consideration in coming to a decision are the absence of enlargement of the spleen, the absence of spots, and of gurgling when the belly is pressed on the right side.

Treatment.

For a period of two to five days give half a teaspoonful or a teaspoonful of castor oil daily until the diarrhœa ceases, or 30 grains of sulphate of soda in water, or a daily dose of ¾ to 2 grains of calomel, either singly or divided, according to age. The purgative will either stop the diarrhœa or temporarily increase it. In the former case, if the diarrhœa does not return, the case may be left to itself. If it returns or is increased, then subnitrate of bismuth should be given in doses of 15 to 60 grains daily and persevered with. If there is much pain ¾ grain each of grey powder and Dover's powder may be given. With regard to diet the same rules must be followed as were indicated in the treatment of ordinary diarrhœa (p. 70).

CHRONIC CATARRH OF THE BOWELS—ATROPHY OF THE BOWELS

The former of these conditions, sometimes known as mucous disease, may arise from an attack of diarrhœa coming on during the course of measles, whooping-cough, or scarlet fever, or may be the result of one of the forms of acute diarrhœa we have already described, or it may develop gradually in an infant who has long suffered from chronic dyspepsia. In young children under eighteen months old, most commonly during the first six months of life, this complaint gradually leads to atrophy of the bowels, in which condition the child does not thrive, and may finally dwindle away and die. With appropriate treatment, however, in the early stages such cases may recover. In older children the condition of catarrh is not so likely to lead to atrophy, and in them is mainly the result of bad feeding. Healthy children nursed at the breast seldom suffer from this complaint unless they are premature or weakly from birth, or unless the mother's milk is poor, and the child has been put to the breast at irregular hours. Bottle-fed babies, especially those of poor and sickly parents, brought up on improperly prepared patent foods, or biscuit food given at too early an age, furnish the largest contingent of cases, beginning to vomit and dwindle away after an attack of diarrhœa or of measles, whooping-cough, or pneumonia.

Symptoms.

When originating in this manner in infants, looseness of the bowels is usually the first thing noticed, the motions being yellow, liquid and frothy, containing undigested curd and a good deal of slime; later on they tend to become green. The infant is peevish and restless, whines continually, and is difficult to get off to sleep. His tongue is coated, the mouth inflamed, and the belly distended and drum-like ; in some cases there is frequent vomiting. It is not to be wondered at that, when this condition of things has lasted some time, the infant begins to waste rapidly, the face becoming shrivelled and wan, the skin dry, loose, and wrinkled, and hanging in folds. The temperature goes down to below normal, and the body, which becomes of a pale, earthy colour, emits a disagreeable, sour, sickly odour. The diarrhœa in continuing consists of motions of a dirty brown colour, or almost entirely of stinking curd, or again sometimes entirely of slime. The orifice of the bowel and the surrounding parts become red and excoriated, or an irritable red rash or boils appear in this situation, while thrush develops in the mouth. Sometimes vomiting is a more noticeable symptom than diarrhœa ; the infant's stomach is so irritable that nothing is kept down, no food seems to agree, and the state of the child goes from bad to worse. When the end comes there may be convulsions, but more frequently the little sufferer passes into a drowsy condition, taking little notice of anything, and being too feeble to cry. At other times the child is carried off by some other disease, such as inflammation of the lungs, or dropsy or consumption may develop. When treatment is successful, relapses often occur, the infant being sometimes better and sometimes worse, and eventually becomes "rickety" as he grows older.

In children over two years of age this complaint is not nearly so serious, and is not followed by atrophy of the bowels, but may lead to enlarged scrofulous glands. It usually attacks weakly children who have rickets, a type of child that is always getting cold in the head, and enlarged tonsils. Such children are to be found not only among the poorer classes, but also among the comparatively well-to-do. A special form of the complaint is apt to come on during whooping-cough, in which there is a large discharge of slime or "mucus" from the bowel ; to this the name "mucous disease" has been given by Dr. Eustace Smith.

Chronic catarrh of the bowels, then, in older children may take the form either of a chronic dyspepsia with constipation and wasting, or of a feverish condition, somewhat resembling mild typhoid fever, and at one time called infantile intermittent fever. In the former type there is often a perverted appetite ; only highly seasoned food pleases the child ; or the appetite may be voracious. The belly is distended, and sometimes painful ; offensive eructations are common, which arise from the imperfectly digested and decomposing food in the bowels. The bowels are usually confined, with occasional attacks of diarrhœa, slime forming a conspicuous part of the motions. The child's tongue is generally coated with irregularly curved thin patches of red, or it may be red and raw-looking all over. In the second or feverish type the temperature rises every night, and there may be neither diarrhœa nor vomiting. The origin of such attacks of fever in a catarrhal state of the bowels must be borne in mind, provided it is certain that there is neither typhoid fever nor inflammation of the lungs present.

Chronic catarrh of the bowels often bears a certain resemblance to "consumption of the bowels," inasmuch as the swollen belly, the capricious appetite and the loss of flesh are symptoms which occur in both complaints; and besides this, parents often become needlessly alarmed into thinking a child is suffering from "water on the brain" because he screams at night and grinds his teeth, or has headaches, whereas these symptoms are very commonly present in catarrh of the bowels.

Treatment.

As in other bowel complaints, careful feeding is of paramount importance. With very young infants, a wet-nurse often solves the difficulty. A baby who vomits frequently and passes unhealthy motions, and who gains no weight week after week, will often put on a pound in less than a fortnight when suckled by a suitable wet-nurse. If this course cannot be adopted, the measures for diminishing the amount of curd in the milk which have been described (p. 70) must be resorted to. A good plan is to mix an equal quantity of peptonised milk and arrowroot water, with two teaspoonfuls of cream to each 6 ounces, duly sweetening with sugar of milk. Sometimes it is beneficial to omit all milky foods for a time, giving whey and barley-water, egg-water, or meat juice. Milk food, however, must be given when the vomiting or diarrhœa shows signs of improvement—needless to add, with great care in its preparation; while children over six months old may have small quantities of Mellin's food added. Fresh air is an important feature in the management of the case. The child should be taken out as long as possible whenever the weather is suitable. When the motions are evil-smelling, castor oil or small doses of calomel should be given to clear out the decomposing substance from the bowels, followed by the mixture of bismuth and tannigen (p. 69). When much blood is passed by the bowel, with straining, an injection of nitrate of silver, 5 grains to ½ pint of water, gives good results.

Older children suffering from chronic catarrh of the bowels must be encouraged in the pursuit of outdoor games, and in riding and driving where practicable. A change to the seaside, or to a bracing hill-climate, is often attended with the happiest results, provided that over-eating and over-fatigue are guarded against. The diet must be simple, digestible, and given at regular intervals, no sweetmeats or biscuits being allowed between meals, nor odds and ends in an attempt to supplement a half eaten meal. The medicines must be chosen with the object of allaying certain symptoms, and inducing a healthy action of the bowels and an improvement in their various juices. They may be divided therefore into two groups: those containing soda, more useful when the *stomach* is irritable, and those containing mineral acids, indicated when the secretions of the *bowels* are mainly at fault. Examples of the first group are the following mixtures :—

PRESCRIPTION 276

Bicarbonate of soda	2 grains.
Pepsin	1 grain.
White sugar	1 grain.

To make a powder, to be given ½ hour after meals.

PRESCRIPTION 277

Bicarbonate of soda	40 grains.
Infusion of rhubarb	1 ounce.
Simple elixir	1½ ounce.
Water to 4 ounces.	

A tablespoonful to be given 3 times a day before meals.

Examples of the latter group are the following :—

PRESCRIPTION 278

Dilute hydrochloric acid . . .	24 minims.
Oppenheimer's solution of euonymin and pepsin	½ ounce.
Spirits of chloroform	24 minims.
Water to 4 ounces.	

A tablespoonful to be given 3 times a day.

PRESCRIPTION 279

Dilute nitric acid	24 minims.
Tincture of nux vomica . . .	8 minims.
Syrup of oranges	½ ounce.
Water to 4 ounces.	

A tablespoonful to be given 3 times a day after meals.

The above prescriptions are for children between five and ten years of age.

The following diet tables, recommended by Dr. Ashby, of Manchester, will give an idea of the kind of régime suitable for a child of five to seven years of age :—

Breakfast, 8 *a.m.*—A breakfastcupful (8 ounces) of bread and milk, made from wholemeal bread ; a teaspoonful of malt extract may be added. This may be followed two or three times a week by the yolk of a lightly boiled egg, on strips of toast, or a piece of toast dipped in bacon fat.

Dinner, 12 *to* 1 *p.m.*—A broiled mutton chop, *finely minced*, or fresh white fish, with mashed potatoes, spinach or French beans, to be followed by ground rice pudding or a baked apple. Milk to drink.

Tea, 4 *to* 5 *p.m.*—A cup of cocoa or milk with toast or stale bread.

Supper, 7 *p.m.*—A cup of beef-tea or mutton broth.

In more severe and protracted cases it is well to avoid farinaceous food as much as possible, as recommended by Dr. Eustace Smith :—

Breakfast, 8 *a.m.*—Half to three-quarters of a pint of fresh milk, alkalinised by 20 drops of saccharated solution of lime ; a slice of toast with yolk of egg, or fresh fish.

Dinner, 12 *to* 1 *p.m.*—A small mutton chop or boiled sole, a thin slice of stale bread, with half to a wineglassful of sherry or bitter beer well diluted.

Tea, 4 *to* 5 *p.m.*—Same as breakfast.

Supper, 7 *p.m.*—A cup of beef-tea.

CONSUMPTION OF THE BOWELS

This disease differs from other forms of inflammation of the bowels in this important particular, that there is distinct ulceration caused by the presence of the tubercle microbe. As has been previously mentioned, children who are wasted and suffering from chronic catarrh of the bowels, which is capable of cure, are sometimes said by their parents to be suffering from "consumption of the bowels." This name, however, should only be applied to an irremediable illness, due to tubercular ulcers in the bowels. It is more common in boys than in girls, and occurs most frequently between the ages of three and ten years, and is probably caused by drinking the milk of tubercular cows, or by the child's food becoming contaminated by the expectoration of people suffering from consumption, as is likely to happen among the poorer classes where one room serves for an entire family. Consumption of the bowels also occurs as a late stage in children affected with tubercular disease in

Cause.

the lung, and is probably caused by infection of the bowels by swallowed expectoration.

The ulceration of the bowels is often associated with enlargement of certain glands in connection with them, called the mesenteric glands, and in proportion as one or other of these symptoms preponderates we get two types of this disease, the *intestinal* and the *mesenteric*. In the former the child suffers from diarrhœa, which at times becomes worse, and at other times may temporarily disappear; the diarrhœa has no special characteristics. The little patient often comes of consumptive parents, and has a "strumous" look, with pale face, long curved eyelashes, and a good deal of downy hair on the skin. His tongue is clear and red; the belly is large, with blue veins unusually marked, and is sometimes tender. There is often feverishness at night. He becomes thin and hectic, and the diarrhœa increases in spite of careful attention to diet and the use of soothing and astringent medicines. If he is not carried off by some acute lung trouble or by "water on the brain," he may linger on for a year or two, becoming at the end extremely emaciated and dying finally of exhaustion. In the mesenteric type of the disease there may be no marked diarrhœa, but the belly is swollen with gas, the skin dry and harsh, and hard masses of glands may be felt deep down which are tender to pressure. There is the same wasting and hectic, with feverishness at night. All these symptoms do not *necessarily* indicate that the child is suffering from "consumption of the bowels," as they may be present in cases of chronic catarrh, but such a condition is to be suspected if, with a bad family history and marked hectic, no improvement takes place in the child's condition by treatment, and the case goes from bad to worse.

Symptoms.

Treatment must be on the same lines as in chronic catarrh of the bowels, in addition to that recommended for consumptive complaints in general. Fresh air is essential; the most nourishing diet is required in a form which will not aggravate any diarrhœa. Starchy and sweet foods should be avoided as much as possible. Eggs beaten up in milk, minced underdone meat with red gravy from the joint, and a certain amount of fat, will usually agree best. Cod-liver oil emulsion with hypophosphites, or one or both of these combined with maltine, should be given when the diarrhœa is not very excessive. When, however, this is marked, other tonics must be substituted and astringents with opium given, such as 1 grain of grey powder with 2 grains of Dover's powder,

Treatment.

every night, or 1 to 3 grains of compound kino powder mixed with white sugar.

TUBERCULAR PERITONITIS

Inflammation of the covering of the bowels is a disease of frequent occurrence in childhood, and in consequence of its giving rise to few symptoms in its early stages is often overlooked. The tubercle bacillus holds the first place as the cause of chronic peritonitis in children, and a combination of this condition with ulceration of the bowels (p. 80), and with the swelling of the glands in connection with them, is extremely frequent.

Symptoms.

Children affected with this disease are weak and out of sorts for some time, and perhaps complain of vague pains in the belly; infants are fretful and whining. The appetite is bad, the bowels are irregular. At one time there is constipation, at another diarrhœa; the child begins to get pale and thin. The belly is now noticed to be swollen and drum-like, and at the sides gives a tense, full sensation as if water were present. There is rarely any vomiting or trouble in passing urine, nor there is any fever, or only a little in the evening. Under suitable treatment and hygienic measures, after a time the fulness of the belly diminishes, the appetite returns, and flesh is gained, and perhaps after a few months the child to all appearance completely recovers.

In severer cases the disease resists all kinds of treatment, the child wastes away, and complains a good deal of pain in the belly, which is also tender to the touch, although it must not be forgotten that pain may be absent from first to last. The belly continues to enlarge, the skin over it is tense and shining, the veins large and irregular, and the navel protruded. Sometimes hard lumps can be felt deep down inside. Thirst becomes intense, the tongue coated, and there is some feverishness. Diarrhœa varies with constipation, and if not carried off by some intercurrent disease the child finally dies of profound exhaustion. In some cases the belly is full of water (dropsy), so that the navel protrudes like a bladder; the skin over it is sodden and doughy, leaving the impression of the fingers when touched. The course of the disease is essentially chronic, and recovery is by no means hopeless. In the majority, however, the wasting and exhaustion continue to the end, which is sometimes hastened by affections of the lungs, brain, or kidneys.

At the onset of the first suspicious symptoms the child should be kept lying down and fed with light nourishment, especially milk, broths, beef-tea, and raw eggs, due attention being also given to fresh air and general hygiene. Poultices and fomentations may be used to relieve pain, the skin being first smeared with glycerine of belladonna. In more chronic forms mercurial friction over the belly may be had recourse to, using an ointment of yellow oxide of mercury, 20 grains to 1 ounce of lard or lanolin, or one of iodoform of a strength 1 in 4, or frictions with green soap, or painting with tincture of iodine and glycerine, equal parts. For the constipation injections should be used; for the diarrhœa, carbonate or subnitrate of bismuth with a small quantity of Dover's powder or compound tincture of camphor, according to the child's age. When the water and thickening begin to be absorbed from the belly, cod-liver oil should be given to infants, and extract of malt with iron, or syrup of the iodide of iron, to older children.

Treatment.

Many cases which seem to be going down hill have been relieved for a considerable time, and sometimes have recovered permanently, after the belly has been opened and drained by operation; and this method of procedure is to be recommended in obstinate cases where no improvement has followed a course of treatment extending over several months.

INTUSSUSCEPTION

This is a form of stoppage or obstruction of the bowels caused by one part of the bowel slipping into another, very much as the finger of a glove can be made to do by pushing in the top. It is the commonest cause of obstruction of the bowels in infants, and occurs more frequently in them than in grown up persons, owing to certain peculiarities in the formation of the bowels, their attachments being looser and allowing of freer movements. It has been stated that diarrhœa plays an important part in the production of this condition, but it must not be forgotten that perhaps more frequently it comes on suddenly in healthy children who have never been affected with any prolonged diarrhœa; nor can injuries, blows, falls, or too rapid movements, such as jumping, or dancing the child up in the air, be credited in any large proportion of cases with being the exciting cause of this complaint. The disorder occurs most often in infants in the first year of life, generally from four to six months; boys are affected more often than girls in the proportion of three to one. The place where the intussusception

Cause.

or infolding occurs is most often at the valve which separates the small bowel from the large bowel (*see* Vol. I., p. 56).

Symptoms.

The attack commences as a rule very suddenly; in the midst of perfect health the child cries, and kicks, as if in violent pain from an acute attack of colic. The belly is tense and hard, and at the same time with a good deal of straining the child passes motions consisting mainly either of blood or of blood-stained slime. The distress continues, and then the child begins to vomit, and the belly gets painful to touch, but on carefully feeling it, unless he is very fat, a lump, shaped like a sausage, may be discovered on the left side near the middle. A finger carefully oiled and passed up into the bowel may feel a small round lump, which is the piece of infolded bowel. If relief is not afforded the motions become more copious and bloody, the infant perhaps passing as many as five or six motions of almost pure blood in a day. The vomiting grows more urgent, and the belly more distended, while the child becomes livid, collapses, and dies, sometimes an attack of convulsions putting an end to the painful scene, which has lasted perhaps three or four days. If the infolding can be righted by means of treatment, the sausage shaped lump will disappear, the pains, vomiting, and bloody motions all cease, the child fall into a quiet sleep, pass some natural motions, and return to his usual state of health, unless a fresh attack occurs, and the bowel becomes again folded in.

The symptoms of the attack are not always so violent, but after the first seizure quiet down to some extent, the vomiting becomes less distressing, the distension and pain in the belly less, and even the straining and bloody motions cease, and a kind of slimy diarrhœa, with a foul, penetrating odour, supervenes. After a few weeks health is gradually restored; this happy result being due to the infolding bowel having righted itself before it became too tightly fixed. This is more likely to occur in older children.

Treatment.

The essential point is to restore the infolded portion of intestine to its proper place, and to effect this the following means are adopted; (1) injections of water, (2) injections of air, alone or combined with (3) mechanical means and massage, and lastly (4) operation. Each of these methods has been attended with favourable results, and each is indicated in suitable cases. The first two methods are not entirely free from danger, since too strong pressure of the injected water or air may cause tearing of the bowel, while too slight a force is useless, and at the same time too strong contractions of the bowel may be excited and the condition aggravated. In using (1) injections of water it is desirable at the same time to give chloroform, and let 1 or 2 pints of tepid water flow into the bowel slowly from a douche can placed at a height of from 3 ft. to 6 ft. above the bed. The water must be prevented from returning by fitting an anal shield to the enema tube, and keeping it in position by adhesive plaster. (2) Air may be injected by means of a Higginson's syringe (Vol. II., p. 310), carefully regulating the pressure, and keeping the hand on the lump to ascertain any change in its position or size. This method may be combined with (3), which consists of holding the child head downwards by the legs and attempting to draw the intestine towards the chest by kneading and stroking movements of the hands; or sudden shaking movements may be performed. Chloroform should be given during these manipulations, which should always be tried, as they are devoid of danger, but they can only be expected to succeed when the infolding of the gut is not of great extent, and has only existed a short time. If either of these methods proves successful, as shown by disappearance of the lump, a few hours should elapse to see if the infant's bowels are relieved, keeping his head lowered and hips raised, and giving small doses of opium. If the lump does not disappear, or if it returns, or if the urgent symptoms are not relieved, and the bowels will not act, then (4) operation is imperatively demanded. In this case the surgeon will open the belly and draw out the infolded portion of bowel.

CHAPTER XLIX

DISORDERS OF THE GENITO-URINARY ORGANS IN CHILDREN

"Bed Wetting"—Retention of Urine—Phimosis—Deposits in Urine—Stone—Inflammation of Kidneys—Vulvitis—Puberty—Menstruation.

BED WETTING

This condition, called also incontinence of urine, is not at all uncommon in children, and may persist in some cases into adult life. An infant makes no attempt to retain his water, and passes it whenever it pleases him, but by careful training the habit of passing it at certain times and in the proper way is soon acquired. Much depends upon the nurse. If she—even when the child is very young—tries at regular intervals to get him to pass his water into the proper utensil, the art is soon acquired, and the average age at which the accomplishment is attained is about eighteen months. This trouble is more commonly met with in boys, but in many of the long-continued cases it affects young women even to the age of eighteen or older.

Cause.

Apart from the continuance of infant habits there are an immense number of conditions which produce this annoying affection, and the great difficulty of treating it successfully which is often met with is to a great extent due to the fact that the cause cannot be discovered. The first step in treatment therefore is to find and remove the cause, and it is well at the outset to recognise the fact that the habit is seldom due to wilfulness or naughtiness. In rare cases it is, and the treatment is then disciplinary, especially in those peculiar cases in which the trouble occurs in schools almost like an epidemic, one child being affected and several others rapidly "catching" the habit. Much misery is likely to be caused the little patient if the disease be treated as a crime, and even sad accidents have occurred through the child using mechanical means, such as tying a string round the penis, to avoid the risk of punishment. The disorder is hereditary in some cases, and is nervous in origin ; it is also in some way allied to epilepsy and St. Vitus's dance. Special attention should be given to the general health, for it is often found that by curing anæmia and debility, by careful dieting and a course of iron, the incontinence disappears. In this way change of air, sea-bathing, and regular outdoor exercise do good. Many cases are distinctly caused by some local affection. The urine may be abnormal, it may be secreted in unusual quantity, it may contain albumen, sugar, or excessive quantities of normal substances, such as urates, oxalates or phosphates. An examination of the urine should always be made with the object of discovering whether these are present, and the suitable treatment may then be applied with immediate success. Again, there may be a long and tight foreskin which causes constant irritation, and many a case of incontinence of urine is removed by the simple and perfectly safe, not to say hygienic, operation of circumcision. A stone in the bladder or thread-worms in the bowel may be the cause, and their removal will be followed by recovery. Further, some cases occur during the process of teething, or may be indirectly due to the presence of disease of the hip joint. Indigestion, whether caused by injudicious feeding or otherwise, should be corrected, as it may be the cause of indirect irritation of the bladder, or of highly acid and unhealthy urine.

The commonest form of incontinence is that which occurs at night ; it may take place once, twice, or many times in a night, but is most frequent in very sound sleep, especially an hour or two after going to bed, and is often induced by the child dreaming that he is passing water in a normal way, only to wake up in alarm to discover his mistake. Sleeping on the back is undoubtedly to be avoided as being conducive to the trouble, and the heavy, unhealthy sleep of children half suffocated by enlarged tonsils and adenoids should also be avoided by removing these possible sources of the disorder.

Treatment.

In every case, therefore, we should start by removing any local source of irritation. The general health should then be improved by tonics—iron, strychnia, or nux vomica—and by hygienic surroundings, and the following measures adopted. The diet must be carefully regulated, and no irritating or indigestible food allowed ; the quantity of butcher's meat particularly should be limited, and no rhubarb—which is unsuitable—permitted. The child should keep good hours, go to bed early, have his last meal some time before retiring, and take no drink within a couple of hours of his bedtime. He should be made to pass water just before getting into bed, be waked again for the same purpose an hour later, and, if possible, once more during the night. He should sleep on his side, and not on his back, and should not be covered with too many bedclothes.

If these measures prove unsuccessful drug treatment must be resorted to. The drug most often found to be efficacious is belladonna ; and it must be given in large doses, for children are not very susceptible to it. If the incontinence occurs both by day and by night, it should be given three times a day, but if it only occurs at night one dose should be given in the afternoon, and one at bedtime. The tincture of belladonna is used, the dose being 5 drops for a child of two, and larger doses for those older. Tabloids containing this amount can be obtained and are not unpleasant to take, even when bitten up. The doses should be gradually increased until a successful result is obtained, or the pupils become enlarged ; they should then be decreased by degrees, the medicine being continued for two or three weeks. Bromide of potash or of soda is useful in definitely nervous patients, especially in girls and young women, 15 to 20 grains being taken at bedtime. Strychnia also is often employed with advantage, more particularly in incontinence of the day, 2 drops of the solution of strychnia three times a day for a child of eight, and 1 drop for a child of four. Cold sponging of the genital organs and the application of the electric current have been found of benefit. Most cases recover under treatment, especially at the age of puberty, but others drift on in spite of every effort, and many show a strong tendency to return even after apparent cure.

RETENTION OF URINE

A healthy infant discharges his urine very shortly after birth, and it is necessary for the nurse to notice if the napkins are wetted. If after twelve hours or so no water has been passed, something must be wrong. This may be due to a deformity, a membrane being stretched across the orifice of the penis, and it must be remedied at once by a doctor. It may be also caused by a tight foreskin, which is described under phimosis (p. 88). In older children a stone in the bladder may check the flow by blocking up the inner opening of the passage, and then other symptoms of stone will be present. Certain injuries may by tearing or bruising the parts block the passage of the urethra, and must be treated by the doctor, or serious mischief may follow. Occasionally retention of urine is caused by tying a string or tape round the penis; this has been done by little boys for amusement, in ignorance of the consequences, but is more often the result of fear in those who suffer from incontinence of urine, and is then done with the hope of stopping the involuntary discharge of urine, and thus escaping punishment. Instances have been known of ignorant nurses using the same method of checking that disorder.

Very often retention of urine is voluntary on the child's part, especially when its passage causes pain, as after circumcision. The proper treatment is to place the child in a warm bath, and if this is not successful to call in the doctor, who may think it necessary to pass a catheter in order to draw off the water.

PHIMOSIS

This is the name given to a contraction of the orifice of the foreskin, a very common affection of infants. It is present at birth in the great majority of male infants, and is one of the objects of the usual examination made by the doctor when the baby first appears in the world. If an attempt is made to draw the skin back it is found to be impossible as the skin is so tightly contracted, and in many cases the orifice is then seen to be very minute, so that it will admit nothing larger than a knitting needle. Occasionally no opening at all exists, which is, of course, a very serious matter, for the infant will soon suffer from distension of the bladder. Even when the opening is only very small much difficulty is sometimes experienced in passing water; it is probably passed very seldom, a long interval elapsing between each act, and much anxiety is thus set up in the minds of the mother and nurse. When it is passed the water collects underneath the skin and "balloons" it out into a large swelling, and it can only escape in driblets or even drops. This is an unhealthy state, for the urine is liable to decompose and set up irritation and inflammation of the skin, and causes much pain and trouble to the infant, as well as increasing the difficulty in passing water. Matter is liable under such circumstances to form under the skin, and the soreness gives severe scalding pain when the water is passed. This inflammation should be treated by frequent washing with boracic acid or lead lotions, which can best be carried out by the use of a syringe with a fine nozzle. After the inflammation has subsided, circumcision will be required. If the child can pass water without difficulty, urgent symptoms may not arise, and certain measures of treatment may be postponed until later. In course of time the natural secretion of the part, which is thick, white, and somewhat of the consistence of cheese, will collect in the space under the skin ; it grows hard, and sets up great irritation and inflammation, almost as if it were a foreign body.

Combined with the tight and elongated condition of skin it is very usual to find firm adhesions of the skin to the penis. These also prevent

Adhesions.

any retraction of the foreskin, or prepuce as it is technically called. The adhesions are liable to set up pressure on the part, and may in this way interfere with its natural development. They may sometimes be remedied, if the skin can be drawn back, by breaking them with a little force, or by passing a fine instrument—like a surgical probe—round between the skin and the penis. When they have all been separated, the collected secretion should be removed, and the part carefully cleansed with boracic lotion, and covered with boracic ointment to prevent the parts from again sticking together. This operation should be carried out every two or three days for a fortnight, when all tendency to adhere will have passed off. It is of importance to carry out this method of treatment pretty rapidly, for the parts are liable to swell, and it may be difficult or even impossible to draw the skin forward again, and the troublesome condition called paraphimosis will be set up (p. 90).

Phimosis, if so extreme that it is impossible to draw back the foreskin at all, is the source of many evils, far more than such an apparently trivial deformity could ever be imagined to induce. First it may cause retention of urine, as has already been explained, with its many possible serious consequences. Again, it may cause constant and violent straining in the efforts to expel the water, and in this way be the cause of rupture and " falling of the bowel." These are common sequelæ, and it is found impossible to cure either of them by the most constant and expert treatment so long as the phimosis is left uncured. The infant becomes a fractious child, he is always restless and crying, and nothing makes him happy until circumcision has been performed. The general health is liable to suffer, and the child does not thrive, but suffers from debility and wasting. Many nervous symptoms are believed to owe their origin to phimosis, such as twitchings of various parts almost like St. Vitus's dance, certain deformities of the legs, and even paralysis, convulsions and incontinence of urine (*see* Bed Wetting, p. 85). If the trouble be neglected, more serious consequences still may follow later, but the troubles already enumerated are sufficient to show the importance of attaining a speedy cure, and it has been necessary to describe them, for there is naturally a great repugnance felt by many parents to have their child subjected to even a slight operation of this kind. But the cure of phimosis is important, and in all extreme cases the only reliable treatment is circumcision. **Circumcision.** Stretching and cutting the skin can be tried, but the results are not satisfactory, and are liable to set up inflammation and swelling, which causes much pain, and ultimately has to be cured by circumcision. The operation of circumcision must be looked upon as trivial, and as being perfectly free from danger if carried out with antiseptic precautions. It is often performed without the use of chloroform, but this is certainly not advisable. The pain to an infant might cause much shock to his nervous system, and apart from this it seems unnecessary and cruel to put him to such suffering. Added to this the administration of chloroform to infants is very easy; they take it well, without evil effects, and it is necessary to give them but a few drops. The relief obtained by the child after the operation has been performed is sometimes astonishing.

Paraphimosis is the condition in which the foreskin has been drawn back and cannot be again drawn forward. **Paraphimosis.** The accident is most often met with in little boys, and must be treated promptly. The parts rapidly become swollen, and if relief is not soon obtained it will be impossible to do so without an operation, by which the tight band of skin is divided. To put things right the penis should be well pressed between the fingers and thumbs to reduce the swelling, and the following measures then carried out. The first and second fingers of both hands are made to encircle the retracted skin and press it forward whilst the thumbs exert firm pressure on the end of the penis in the opposite direction. To prevent the recurrence of this trouble it is often advisable to perform circumcision.

DEPOSITS IN URINE

In childhood it is not uncommon for deposits to occur in the urine, that most frequently seen being uric acid. In older children it shows as a sandy, red-pepper-like deposit in the chamber vessel; in infants as a dark staining or reddish sediment on the napkins.

The cause of this condition is unknown, but it is predisposed to by the child being given an unduly small amount of fluids; it occasionally occurs during the convalescence from scarlet fever. The urine passed with the motions or after exercise is more likely to show this deposit.

Symptoms.

In an infant the symptoms which may be present are fretfulness and crying, as if in pain, with drawing up of the legs when passing water. In older children the desire to pass water is very frequent, and not uncommonly the child wets the bed, passing it in his sleep. He may also complain of pain in some such situation as the loin, groin, or urinary passages.

Treatment.

With uric acid deposits the urine is acid (*see* Vol. I., p. 151). The treatment is to encourage the child to drink plenty of pure water, as much as he pleases, between meals, for in this way the passages are flushed out, and the solids of the urine are dissolved. The meat and nitrogenous articles of diet should be restricted in amount, but milk and vegetables may be taken freely.

The best drugs are citrate of potash, carbonate of potash, and citrate of lithia, any of which may be given in 5-grain doses three or four times a day, well diluted with water or milk. Small quantities of natural alkaline waters such as Vichy are useful. These alkaline medicines should be continued until the urine becomes faintly alkaline, as is shown by a test paper (Vol. I., p. 149).

STONE OR CALCULUS

Symptoms.

The various deposits enumerated in the last section may collect and agglutinate, forming concretions of varying size, which are called stones. The most common variety is uric acid, which occurs with acid urine, but phosphatic stones may occur with alkaline urine and inflammation of the bladder. The signs by which the presence of stone in children may be recognised are pain in the loin (in kidney stones), in the lowest part of the abdomen or in the fork (in bladder stones). There is also with bladder stones the very characteristic sign of a sharp pain at the end of the penis, which leads the child to be always pulling at it to ease himself; it is usually worst when passing the last drops of water. There is a constant desire to pass urine which, if resisted, may lead to its passage involuntarily. Blood is often present, especially in the last urine passed. The constant straining to empty the bladder frequently leads to "falling of the bowel" and rupture.

These symptoms should be sufficient to make one suspect the presence of calculus, but it can only be placed beyond doubt by the passage, by a surgeon, of a metal instrument called a "sound," by which the stone can be both felt and heard.

The only treatment applicable is surgical—the bladder must be opened and the stone extracted, or the stone may be crushed up and washed out (*see* Vol. I., p. 179).

ACUTE INFLAMMATION OF THE KIDNEYS (NEPHRITIS)

Cause.

In children the kidneys are very rarely affected by acute inflammation as the result of exposure to cold and wet, but in adults this is the most common cause (Vol. I., p. 165). When this disease does occur in children—a not infrequent event—there is almost always some poison present in the blood which has irritated the kidneys, and perhaps rendered them vulnerable to some slight chill. The blood poisons which most commonly act in this way are those of various feverish and infectious diseases, such as scarlet fever, diphtheria, chicken-pox, typhoid fever, erysipelas, and even acute eczema, the first named being most important of all (Vol. I., p. 133).

Certain drugs, notably Spanish fly and turpentine, have been known to inflame the kidneys, so also has excessive indulgence in highly flavoured foods. Children are liable, too, to suffer from acute nephritis after severe burns and scalds, and injuries which involve the nervous organs.

The disorder is very liable to be overlooked, for the urine of an infant or a young child is seldom examined unless there is special reason, and great damage may therefore be done to the kidneys before any treatment is adopted. The importance of a regular and routine examination of urine has been insisted upon when considering scarlet fever, and it is necessary to be as attentive to this point in all severe and highly feverish diseases of childhood, especially when any doubt is felt as to the origin of the illness. It is well to remember that the kidneys are liable to be affected even in mild cases of scarlet fever, and that attacks of nephritis which come on without any apparent cause may really follow so mild an attack that the symptoms have been altogether overlooked. In such circumstances the original illness may be only recognised after the kidney symptoms have developed by finding peeling of the skin in patches on the palms, soles, or elsewhere.

The symptoms of most cases are well marked. Fever runs high, ranging from 100° to 103° or even more, and may be ushered in with a shivering fit. The pulse is quick and tense, the tongue furred, the appetite lost, and the bowels constipated. Headache and giddiness are common, and in the later stages of severe attacks there are violent vomiting, convulsions, and partial unconsciousness. The urine grows more scanty and thick, contains albumen and a varying amount of blood, and if the case be not relieved by treatment, it may be suppressed, the kidneys ceasing altogether to secrete. Dropsy is a prominent symptom, and is shown by swelling first of the eyelids and face, then of the feet, legs and body.

Symptoms.

From this list of symptoms it can be well seen that acute nephritis is accompanied by serious danger to the child's life, but there is a hopeful side also, for early and appropriate treatment is very successful, and is capable of warding off the dangerous symptoms. Most attacks in healthy children, if treated without delay and with thoroughness, recover completely without leaving any permanent kidney trouble. On the appearance of symptoms the child should be at once put to bed in a flannel nightdress, and between the blankets. Treatment should be prompt, for delay is dangerous. One important indication is to relieve the kidneys of the excess of blood they contain by drawing it to other parts; for this purpose a hot linseed poultice should be applied, large enough to cover the loins and encircle the body. It should be as hot as can be borne, may with advantage contain a little mustard, must be pressed well against the skin, be covered with oil-silk, and be renewed as soon as it gets cold.

Treatment.

A good purge should be at once administered, the best being a dose of calomel of 1 or 2 grains, followed in three or four hours by a couple of tablespoonfuls of limonade purgative or solution of magnesium citrate. The dose must be adapted to the child's age, that suggested being suitable for one of five years. The bowels must be kept loose, and acting two or three times a day. This will relieve the kidneys of some of their duties, and the skin may be made to do likewise. For this purpose free sweating is essential; it may be encouraged by hot air, steam or hot water baths. The first are the most efficacious, the second are valuable but not so active, and the third make a good substitute if the necessary apparatus for the others cannot be obtained.

A hot-air bath is carried out as follows: The sheets are removed from the bed, and the child is covered with a blanket or flannel nightdress. A blanket is placed under him, and a large cradle or wickerwork support over him ; the latter is covered with blankets, with a mackintosh beneath them, carefully tucked in all round, and drawn closely about the neck so as to exclude cold air and shut in the hot. A lamp is then lighted at the foot of the bed from which hot air is carried by a metal tube beneath the cradle, one of the best apparatus being Allen's lamp (Fig. 94), from which the boiler has been removed. The heated air should enter at a higher level than the patient's body, and not sufficiently close to run any risk of burning him. The covering blanket should then be removed, and the lamp kept burning for from fifteen to thirty minutes, but the patient should never be left alone for fear of accidents, such as faintness or fire. The head may be wrapped round with a towel wrung out of cold water and changed if necessary. Free perspiration will soon be produced, and may be encouraged by drinking plenty of fluids. With this apparatus the temperature inside the cradle will be found by a thermometer to rise to 110° or even 150°. After free perspiration has been induced all over the body, the patient should be rapidly rubbed over with a warm towel and carefully wrapped up in blankets.

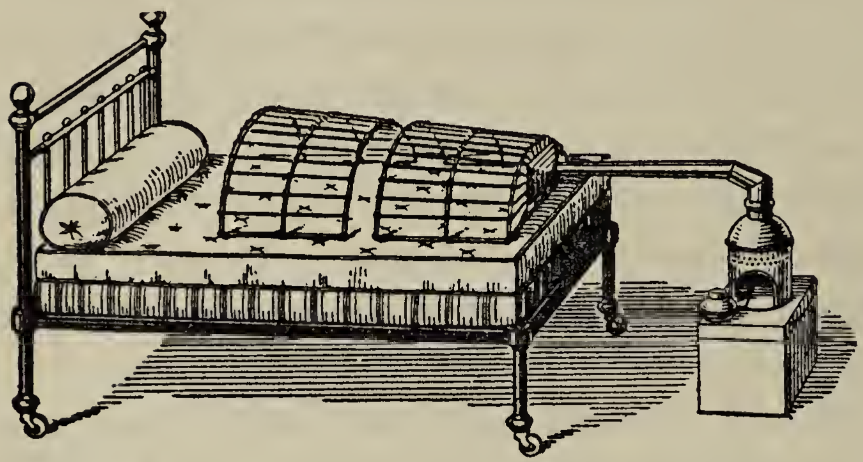

Fig. 94.—ALLEN'S PORTABLE HOT-AIR BATH.

A vapour or steam bath may be given with a similar apparatus if the boiler be used. Or a bronchitis kettle with a slanting spout (Fig. 95) may stand on the fire, and its spout be inserted under the clothes. An ordinary kettle may be adapted to the purpose if it be provided with a long tube to pass under the bedclothes, or even bricks may be heated and wrapped up in flannel which has been soaked in hot water and placed in a dish inside the bed under the cradle. If a hot-water bath is employed in these cases, the water should be of the temperature of 95°

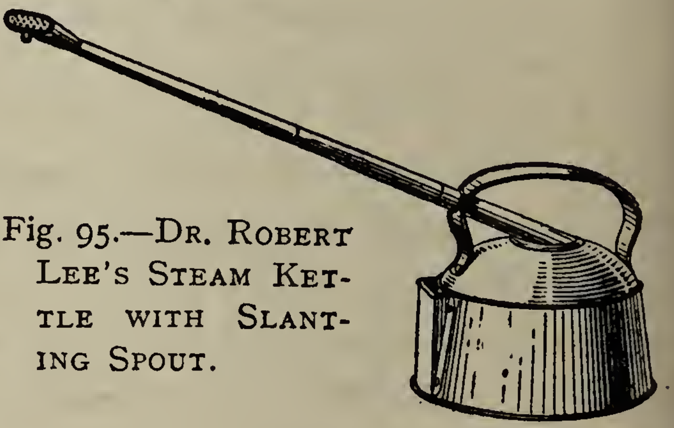

Fig. 95.—DR. ROBERT LEE'S STEAM KETTLE WITH SLANTING SPOUT.

to 105°, or it may be gradually raised from 95° by adding hot water whilst the patient is in it. It should be continued for about fifteen minutes, and the child should then be dried rapidly with a hot towel, wrapped in a warm blanket, and well covered up in bed.

Combined with some of these measures a fever medicine which will aid the various organs in their action should be given, such as—

PRESCRIPTION 280

Citrate of potash	60 grains.
Solution of acetate of ammonia ,	3 drachms.
Tincture of aconite	12 drops.
Glycerine	½ ounce.

Cinnamon water to 3 ounces.

A dessertspoonful to be given every 2 hours with a wineglassful of water: for a child of 7.

Few disorders produce so rapidly a marked condition of bloodlessness as inflammation of the kidneys, and the treatment must be directed to counteract this tendency. As soon, therefore, as the severe early symptoms and especially the fever abate, a simple and easily digested iron mixture should be given:—

PRESCRIPTION 281

Citrate of potash	60 grains.
Citrate of iron and ammonia . .	30 grains.
Glycerine	½ ounce.
Syrup of orange	2 drachms.

Chloroform water to 3 ounces.

A dessertspoonful to be given every 3 or 4 hours.

The child's food is to be entirely fluid, all solids being withheld; it should consist of milk and barley water, half and half, in small quantities and frequently, and on no account should broth, beef-tea, soups, or any meat extracts be allowed. As recovery sets in pure milk may be given, and later still simple starchy foods may be added, such as arrowroot, Benger's food, oatmeal, etc. Orange juice, grapes, and a baked apple are not injurious, and make a pleasant variety. The last foods to be added to the dietary are the various meats, which must only be given with great caution, and some weeks after all the albumen has disappeared from the urine. During convalescence the body should be kept warm with woollen clothes, and the patient should only be allowed out on warm dry days. Exercise should be recommenced with great discretion, for it is likely to do much harm if taken too soon.

CHRONIC INFLAMMATION OF THE KIDNEYS

A chronic inflammation of the kidneys is sometimes met with in children, in some cases following an acute attack which has been imperfectly cured. This possibility emphasises what we have said above regarding the great importance of most carefully watching the condition of the urine during convalescence, and shows how important it is to examine it for albumen from time to time. The routine examination is of special importance after scarlet fever, which is so common a cause of both acute and chronic kidney disease.

Cases are known in which the urine of children may remain perfectly free from albumen so long as they are kept in bed or in a warm room, but shows the presence of it directly they go out of doors or exert themselves in any way. This condition, so difficult to recognise without careful examination, may lead ultimately to an incurable and finally fatal disease of the kidneys. The unhealthy surroundings so prevalent among the neglected children of the poor are also believed to lead to chronic kidney inflammation.

Another form of kidney disease of an insidious nature is often met with in childhood, but seldom before the age of five, simply because its producing causes do not occur until then. This is called the "waxy kidney," and is set up by those conditions which cause great exhaustion and debility of the system. It may follow hereditary syphilis, consumption, or long-continued ulceration of the bowels. But more commonly it follows the excessive drain caused by a prolonged discharge of matter. Whatever may be the origin of the discharge the result is finally the same, but it is acknowledged that discharge from diseased bone is one of the most fruitful and frequent causes. Children are very liable to disease of the bones of the spine and of the joints, especially of the hip-joint, and these affections are most intractable and may continue to pour "matter" out of the body for many months, in spite of the most thorough and skilful attention.

The symptoms of the various forms of insidious kidney disease are very similar. The first probably to attract attention is the anæmic and debilitated appearance of the child, who, without being feverish, grows gradually weaker, thinner and paler. The digestion soon suffers,

Symptoms.

and the obstacle thus produced to the taking and assimilating of food much aggravates the tendency to waste. The next symptom which appears is dropsy, which causes a swelling in various parts of the body, first in the face and eyelids, which become puffy and waxy looking, next in the feet and around the ankles, which pit when the finger is pressed on them. All this time albumen is being continually lost in the urine.

Treatment.

Prompt treatment may check the trouble, but neglect will lead to progressive exhaustion and a fatal issue. Warmth, rest in bed, regulation and free action of the bowels, and stimulation of the functions of the skin by methods similar to those advised for acute inflammation, are measures which should be at once adopted. They should not be so energetic as in acute nephritis, but will require to be more prolonged. Many cases under this management gradually recover; others grow worse, the dropsy spreads, the kidneys fail to do their duty, the waste products which they should discharge from the body accumulate and set up convulsions and unconsciousness. Such cases are too serious for domestic management, and the circumstances which guide in the treatment by drugs (apart from those already mentioned for acute cases) are so difficult to determine that it would not be profitable to pursue the subject further. In the "waxy kidney" the first desideratum is to remove the source of the discharge, and this will usually require an operation which too often is beyond human skill.

VULVITIS

Cause.

This is an inflammation of the external genital organs of female children, and occurs not unfrequently in ill-fed, debilitated, and neglected girls of from two to five years of age. It is set up by various forms of irritation, such as the prolonged contact of the parts with filthy diapers, or their long soaking in urine and fæces, or simply through neglect of ordinary cleanliness on the part of the nurse. Thread-worms are also a fruitful source of the trouble. Many severe diseases, but more particularly measles, are the original cause of the predisposing debility. It is important to recognise the possible causes, for many unfounded charges have arisen against perfectly innocent persons from the idea that the discharge is induced by infection from others. But this simple form of inflammation, although in many cases it arises *de novo*, is very infectious, and may spread from one child to another.

The sufferer is feverish and ill, and the parts are swollen, hot, red, and itching, and in some instances, besides discharging freely, are superficially sore and ulcerated.

Treatment. The general health always needs improvement. The child should be fed up and given tonics, such as cod-liver oil and iron, and her digestive organs treated with suitable medicines. Locally perfect cleanliness is of first importance. The parts should be frequently washed with antiseptic lotions such as perchloride of mercury 1 in 2,000 of warm water, or boracic acid 7 grains to 1 ounce of water, and then carefully dried with absorbent cotton-wool. A powder should then be dusted over them:—

PRESCRIPTION 282

Starch	1 ounce.
Boracic acid	½ ounce.
Oxide of zinc	½ ounce.

"The dusting powder."

The parts should be kept from contact with each other by placing between them small pads of absorbent wool or antiseptic gauze.

PUBERTY

This is the period of life intervening between childhood and maturity, the transition stage during which a child develops into manhood or womanhood. It is a time of great importance, and requires very careful management and supervision. The age of its occurrence varies much according to circumstances. It appears earlier in warm climates, sanguine temperaments and highly cultivated and luxurious states of society. In this country it usually begins in girls between the ages of twelve and fifteen, and in boys about two years later. In boys the various changes take place but slowly, and are spread over several years, so that they attract but little attention. In girls, on the other hand, the changes are rapid, and in the course of perhaps but a few months the girl seems to have become a woman. In both sexes the reproductive organs and their functions are rapidly developed.

In boys the most obvious changes are the growth of hair on the face and the breaking of the voice. Owing to the development and enlargement of the thyroid cartilage or "Adam's apple," the vocal cords become elongated, and the voice alters from the childish treble to the deeper tones of the young man. In girls the figure becomes full and matured, the temperament changes, the breasts enlarge, and the function of menstruation is established. At no period in later life has the body to undergo such marked changes, and the health during the process of evolution is specially liable to be disturbed by adverse influences, particularly in the female sex. It is a time of life which, in the delicate especially, requires care, plenty of fresh air and good food, and absence of worry. Unfortunately it is at this very period of life that education is considered all important, the general health is too often neglected, and the brain and nervous system are goaded into excessive activity, and overstrained in the effort to pass some examination or excel in competition with schoolfellows. It is not surprising, therefore, that in many instances, especially in girls, the nervous system breaks down under the double strain, and all sorts of nervous disorders show themselves, more particularly in those who have hereditary tendencies to nervous troubles. This is a time when hysterical manifestations are very rife, when headaches develop, palpitation arises, and hæmorrhages may occur from many parts of the body.

The general management of the girl during this stage of development is both moral and physical. Many important facts have to be disclosed to the youthful mind which will be useful for future guidance, and keep the feet firm in slippery places. The body, too, requires constant care; rapid growth and development call for much nutritious food, plenty of fresh air and regular exercise, and ample hours of sound sleep.

MENSTRUATION

This is naturally regarded as the most important change which occurs at the development of puberty. It is also called the menses, menstrual period, "courses," or catamenia. The time of its onset is from thirteen to seventeen, but most frequently during the fifteenth year. Some cases of precocious menstruation are known in which even new-born babies have had a monthly discharge of blood from the womb, but these are of course merely curiosities. The duration of each "period" is from three to five days, though it may vary from one to ten even in perfect health. The intervals are usually twenty-eight days, though they are subject to variations, the limits being from twenty-six to thirty days quite apart from a condition of disease. In health the loss continues at regular intervals for from thirty to thirty-three years, throughout those years of a woman's life during which she is capable of bearing children, being interrupted only by pregnancy, lactation, or ill-health.

The first time that a perfectly healthy girl menstruates is ushered in by no premonitory symptoms, and she is usually surprised by noticing a discharge of blood. In nervous girls this may cause much alarm and lead to a fainting fit or even an attack of hysterics. In other cases there may be slight fever and a complaint of lassitude, pain in the back and down the thighs, a sensation of fulness in the lower part of the abdomen, and slight itching of the parts. There may be a passing diarrhœa during the flow, constipation being the rule during the interval. Various eruptions are not uncommon, a form of nettlerash consisting of red pimples or patches appearing on many parts of the body, or acne spots on the forehead or between the shoulders. The discharge, at the beginning and end of the period, is formed of blood mixed with mucus, but at its height is pure blood. Very often for a few days afterwards there is a white discharge of mucus only. In many cases a peculiar odour is noticed, which has been compared by some to the smell of the marigold. As a rule, no special treatment is required during normal menstruation, but it is necessary to be careful regarding certain particulars. The diet must be simple and free from stimulating, rich, and indigestible articles; exercise must be moderate and never carried to extremes, for there is no doubt of the injurious effects of excessive exertion, such as dancing, violent games, or mountain climbing; and exposure to cold and damp must be avoided. The discharge is very likely to be checked by a severe wetting, or by getting the feet damp and cold.

The chief disorders of menstruation are (1) a deficiency or absence of the discharge, amenorrhœa; (2) an excess or profuseness of the discharge, menorrhagia; and (3) the presence of pain or difficulty, dysmenorrhœa.

Amenorrhœa.

Amenorrhœa, or the absence of the menstrual flow, is a natural accompaniment of pregnancy and lactation, and is not necessarily therefore a disordered function. All conditions which tend to impair the health and lower the nutrition of the body may suppress menstruation. The very changes which accompany puberty may themselves prove more than the strength can bear, and may cause debility and amenorrhœa. The nutrition of the body becomes impaired, there are rapid wasting, neuralgic pain in many parts, and marked symptoms of debility. But of all causes anæmia is the most common cause of disappearance of the menstrual flow. The patient is excessively pale, is languid, listless, and lacks energy, the periods may occur scantily and irregularly, and finally disappear for months or even years. Want of food, improper food, lack of fresh air and of exercise, and many other unhealthy conditions, impoverish the blood and check the natural losses. A similar effect may follow violent emotional disturbances—sudden fright, excessive grief—a change from country life to that of London, or exposure to cold. Apart from such causes as the foregoing, amenorrhœa may result from disease of the special organs concerned in the function, from removal of the two ovaries, or from disease of other parts, as tubercle of the lungs, Bright's disease of the kidneys, and various affections of the liver, stomach, and nervous system.

The treatment of amenorrhœa due to debility or anæmia must naturally be directed to improving the general health. The causes of malnutrition must be removed ; change of air, healthy exercise in the open air, and nourishing diet must be secured. Of drugs none is so powerful or so certain in its results as are the various forms of iron, and it is recognised as almost a routine treatment in the amenorrhœa of debility in young women to put them through a course of iron. As so many of the essentials of treatment just mentioned can be obtained at watering places, it is an excellent plan to pay a three weeks' or a month's visit to one of the spas where iron waters are found.

Menorrhagia.

Menorrhagia, or profuse menstruation, may be due to many diseases of the generative organs, which cannot here be considered in detail. It may be caused also by any condition which produces congestion of the uterus, such as disease of the heart, lungs, and liver. Powerful mental impressions, habitual constipation, and extreme obesity may have a similar effect. The trouble is also not uncommon at the time of the "change of life." Many of these cases are unsuitable for domestic treatment, for hæmorrhage may be due to internal disease which only a doctor can recognise. The chief measures for profuse loss at the periods which can safely be employed are complete rest in bed during the continuance of the hæmorrhage, with hot douches and a mixture containing ergot and an astringent iron preparation :—

PRESCRIPTION 283

Liquid extract of ergot	½ ounce.
Tincture of steel	80 drops.
Glycerine	½ ounce.
Spirits of chloroform	2½ drachms.

Water to 8 ounces.

An eighth part to be taken 3 or 4 times a day.

Dysmenorrhœa.

Dysmenorrhœa, or painful menstruation, is a common affection. Though some women may be quite free from all pain or discomfort of any kind at the monthly periods, it is more usual for them to suffer more or less in some way. They may have backache, headache, or a feeling of inability to exert themselves; and occasionally the pain may be so severe as to incapacitate them from continuing their ordinary occupations, and necessitate their remaining in bed or resting on a couch for the first day or two. The pain may be excessive before the flow, and pass off gradually as it is well established; and it is then very possibly due to a contracted condition of the passage of the womb. This form is much relieved by an operation whereby the passage is stretched.

Again, the pain may be a true neuralgia, when it is likely to be excessively severe and accompanied by a feeling of heat, cold hands and feet, sick headache, and hysterical symptoms. Most cases of painful menstruation are relieved by rest in bed in the recumbent position for the first day or two of the flow. All mental exertion and worry should be avoided, and the patient should keep very warm, have a hot-water bottle in bed, drink hot tea, or take a hot hip bath. The hands and feet should particularly be kept warm, and relief is often obtained by placing them in water as hot as it can be borne. It is very important to avoid, as far as possible, the use of alcoholic stimulants and strong narcotic drugs, for if such things are indulged in the regular monthly recurrence of the trouble is liable to establish a habit or craving which the utmost determination may be unable to overcome; they should therefore never be employed without the advice of a medical man, but there is no doubt that much relief may sometimes be obtained by the use of such drugs as phenacetin and antipyrin.

The menopause or climacteric are the terms applied to the "change of life," which occurs some time between the age of forty and fifty, in the majority of cases at about forty-eight. It may take place quite suddenly, the monthly period ceasing once and for all without trouble of any sort. Or it may be gradual, the losses being irregular for many months ; one period may be very profuse, the next three or four being scanty or even absent. Flushes and heats and free perspirations without cause are frequent accompaniments of the change. The tendency to put on fat—especially about the abdomen—and to develop piles is not uncommon. If the symptoms are troublesome and the nervous system tends to suffer, the following mixture often gives relief :—

Menopause.

PRESCRIPTION 284

Bromide of potash	80 grains.
Sal-volatile	2½ drachms.
Bicarbonate of potash . . .	2 drachms.
Tincture of cardamoms . . .	2 drachms.

Chloroform-water to 8 ounces.
An eighth part to be taken 3 times a day.

CHAPTER L

DISEASES OF THE NERVOUS SYSTEM IN CHILDREN

Tubercular Meningitis—Simple Meningitis—Water on the Brain—Infantile Paralysis—Pseudo-hypertrophic Paralysis—St. Vitus's Dance—Epilepsy—Convulsions—Disorders of Sleep—Headaches—Affections of Speech—Deaf Mutes—Stammering—Mental Affections—Blindness.

TUBERCULAR MENINGITIS

This disease is rare under the age of one year, but is not uncommon after this up to the time of puberty. It may form part, and often the fatal part, of a general tubercular infection, or it may come on insidiously without any apparent cause.

Symptoms.

The symptoms are produced by the formation of tubercles on the membranes of the brain, especially about the base or under surface. Inflammation is thus set up, which spreads widely both over the surface of the brain and into the spaces or ventricles in its interior. Watery fluid oozes from the blood vessels, and causes distension of the spaces and pressure on the brain substance, producing one form of "water on the brain," or acute hydrocephalus. These changes explain the course the disease takes, as we shall see the first symptoms are characterised by excitement and irritation of the brain caused by inflammation, the later symptoms by drowsiness and insensibility, due to pressure from the accumulated fluid.

The disorder is usually preceded by a period of ill health, which may be left by an attack of measles or whooping-cough. The child has lost flesh, has suffered from cough or indigestion, has been constipated and off his food, or has had occasional attacks of unexplained feverishness. Or there may have been symptoms affecting the nervous system, such as irritability, peevishness, listlessness, restless sleep, headache, or a temporary squint. In other cases the attack may be sudden: a child in apparently perfect health suffers from violent vomiting or becomes unconscious or paralysed.

In whatever way the symptoms may begin, there is almost always fever, the temperature being very uncertain in its course, but having a tendency gradually to rise each day a little higher, and always higher of an evening than in the morning ; until, when the other symptoms are well established, it may reach a point between 102° and 103°. The premonitory stage of this disease is always accompanied with much anxiety, for there is great difficulty in forming a decided opinion as to what is the matter with the child. But the symptoms grow more severe, the pulse becomes rapid and irregular, the breathing also is deep, sighing, and irregular, and in the late stages assumes what is known as the Cheyne-Stokes character, in which the breaths are drawn very rapidly for a time and then cease altogether for several seconds. Nervous symptoms now show themselves, such as twitchings of the mouth or eyelids or general convulsions followed by paralytic conditions affecting the eye, eyelids, face, or extremities. Vomiting is very frequent, and is unconnected with the taking of food, although its first appearance may be after a meal. The tongue is clean, and the vomiting continues in spite of the stomach being empty. It may be incessant or disappear altogether for a time without reason, only to return with greater violence. Another marked symptom is the drawing back of the head from firm contraction of the muscles at the back of the neck. Headache is severe and is accompanied with giddiness, irritability, and extreme sensitiveness to the slightest light or sound. Sleep is disturbed by bad dreams, and the child wakes suddenly with a peculiar distressing cry, or grinds his teeth whilst asleep.

In infants the fontanelle is full and bulging, the veins on the forehead may be distended and prominent, and the head itself may be actually enlarged from the pressure of the fluid poured out within it.

In course of time drowsiness sets in, the child can hardly be kept awake, and seems to prefer to be left to himself ; he grows gradually less alive to things around him, and finally passes into a state of complete unconsciousness. Nothing now will arouse him, although he may still continue to swallow fluids when they are put into his mouth. This lasts perhaps for days, but finally the distressing illness ends. The disease may be spread over several weeks, occasional intervals of apparent improvement intervening, but the general course is downward, and it is but few cases that recover.

Although there is little hope of saving the life of a child suffering from tubercular meningitis, it is essential that treatment should be

Treatment.

carried out with every care and with unremitting attention, for it is a matter of the greatest difficulty to distinguish between simple and tubercular trouble within the skull, and from many attacks of the former condition there is complete recovery under suitable measures. As soon as any signs denoting implication of the structures within the skull show themselves, the child should be put to bed in a darkened room, the air of which is kept fresh and cool, and only the necessary attendants should be admitted, absolute silence being observed as far as possible. By this means rest is obtained for both body and nervous system. When taken out of the cradle or bed, the child must lie on the lap or in the arms, and when moving him or walking about with him, the movements should be as gentle and equable as possible. This extreme care should be continued even if improvement ensue, all excitement, noise, or merriment being avoided. The diet must be restricted to the blandest and most nourishing foods, and must be suited to the child's age. Milk diluted as required is the most suitable article, but if the vomiting is severe it must be peptonised. Occasionally no food can be retained in the stomach, and both food and medicines must be given in the form of injections into the bowel. A good purge is with advantage given in the early stage, 1 grain of calomel with 10 grains of powdered white sugar at night, followed the next morning by fluid magnesia or other simple saline draught. A sedative bromide of potash mixture should next be administered :—

PRESCRIPTION 285

Bromide of potash	2 drachms.
Iodide of potash	12 grains.
Tincture of orange	2 drachms.
Chloroform-water to 3 ounces.	

A teaspoonful for a child of 1 year, a dessertspoonful for one of 4 or 5 years, to be given 3 or 4 times a day.

There should be cold applications to the head—cold water cloths, evaporating lotions, or an ice bag, but the last requires great care, as it may cause severe depression. These cases are very serious, and require all the skill and experience that can be obtained both from doctor and from nurse.

The great fatality attending tubercular meningitis makes its preventive treatment of special importance. Many bereaved parents who have already lost one child from this dire disease will be anxious to know what measures can be taken to guard others from a similar fate.

Prevention. There is no medicine that will do it, but much may be done by care and judicious management. It will be necessary to adopt the various measures recommended for tuberculosis (Vol. I., pp. 304, 305) in connection with the rearing of children, their mode of life, surroundings, and diet. Of special importance in connection with tubercle of the brain is the matter of education. This should be carried on very cautiously; the attention should only be occupied for a short time together, book work should be very limited and never allowed to cause anxiety or strain, the memory should not be over-burdened, and every species of intellectual excitement should be avoided. It is well to let the brain acquire strength before any burden is laid upon it, and to train the child's mental powers with nature as a teacher in the open air amongst the fields and flowers.

SIMPLE MENINGITIS

Inflammation of the brain and its membranes may occur apart from the presence of tubercle. It is then most frequent in the first two years of life. It may be caused by the spread of inflammation from disease of the middle ear, by injuries to the head or by the poisons of severe diseases, such as pneumonia, typhoid fever, scarlet fever, pyæmia, or erysipelas. It is liable to occur in hot weather, and is believed then to be due to exposure to the direct rays of the sun. The symptoms are so similar to those already mentioned as occurring with tubercular meningitis that it is not necessary to repeat them; indeed, there is great difficulty in distinguishing the two conditions. If there is a definite history of a blow on the head, or signs of long continued ear disease, simple meningitis is the more probable. If, on the other hand, tubercular disease is present in other organs, or there is a strong tubercular family history, our suspicions should turn in the other direction. Simple meningitis has the more sudden onset and the more rapid course.

Treatment. In attempting to relieve the symptoms set up by simple inflammation, the same general measures as are recommended for tubercular inflammation must be adopted. There is also the possibility that the trouble may abate if there is some local condition which is removable by surgery. This is sometimes possible in disease of the ear, in injuries to the skull, and in those cases in which pressure is causing unconsciousness; in the latter case fluid may be withdrawn through a hollow needle. Great care should be taken of children if they have sustained a severe fall on the head, especially if accompanied by unconsciousness or stunning, however transitory. They should be kept quiet and still, free from excitement or merriment, until the brain has had time to recover itself and the disturbed circulation has returned to its normal state.

"WATER ON THE BRAIN"

This affection, hydrocephalus, may be acute or chronic. The acute form is due to inflammation, and its symptoms and treatment are described under Tubercular Meningitis (p. 104).

Chronic hydrocephalus is not caused by inflammation, but is more of the nature of a dropsy of the brain, in which the ventricles or cavities in the interior of the organ become enormously distended with fluid, the brain itself being stretched and thinned and the skull much altered in shape. The complaint may originate before the birth of the child, and the great enlargement of the head may cause much trouble at the birth. Most cases, however, first show themselves when the child is a few weeks or months old. The fluid gradually increases in the head, and the bones of the skull, which are soft and ununited to one another, are forced apart, leaving wide gaps of soft material between them. The natural openings or fontanelles are much larger than normal, and bulge outwards from the fluid pressure within. The presence of fluid can be distinctly felt with the finger over the soft parts, and even the bones themselves may become so attenuated as to bend inwards with the slightest pressure of the finger.

The deformed skull of this disease may be mistaken for that of rickets, a serious mistake, for hydrocephalus is a very dangerous and usually fatal disease, whilst rickets is a most curable one. The head distended by water is round and globular, bulging in all directions; whilst that of rickets is square, with a flat top and thickened edges along the junction of the bones. The large head of a big brain, which may mean an extra share of intelligence, may be recognised by the absence of any separation or thinning of the bones, and by the absence of bulging at the fontanelles.

The appearance of a child with water on the brain is most peculiar: the head is enormous, the forehead rounded and bulging forward over the diminutive face. The skin on the forehead is thin, shiny, and stretched, with large distended veins, the eyes project and turn downwards, showing the whites above, and there may be much difficulty in closing the lids over them. An infant cannot raise his head from the pillow owing to its great weight, and if it is raised he allows it to roll about in a helpless sort of way. If a hydrocephalous child is able to walk, he does so with a peculiar rolling gait, owing to the great size and weight of his head. In some cases the intellect is unimpaired; in others the child is idiotic and helpless. Paralysis and deformities of the limbs are common, and blindness may result from pressure and stretching of the optic nerves.

Few hydrocephalic children live long; they grow thin and wasted, even though they may eat well, and die whilst quite young, though in exceptional cases they may live on into adult life. Some cases, on the other hand, recover; the fluid is absorbed, and the skull, though larger than natural, assumes nearly its ordinary appearance.

Treatment.

The results of treatment are not very hopeful. Sometimes mercury proves beneficial, either when given as grey powder or rubbed into the skin as ointment. Iodide of potash also may be of use. The application of a firm bandage or of strapping round the head has been tried with success, and some cures have occurred after drawing off the water through a hollow needle; but all treatment is unsatisfactory, and requires skilful management. These cases are not suitable for domestic treatment, but should be placed in the hands of one conversant with the disease.

INFANTILE PARALYSIS (POLIOMYELITIS)

Infantile paralysis, or the essential paralysis of children, is caused by acute inflammation in the spinal cord; the part affected is remarkably localised, being limited to the cells in the front part of the grey substance (*see* Vol. I., p. 327). The affection is almost peculiar to children, although a similar condition is occasionally met with in adults. The great majority of attacks occur in children under ten years old, but they are very rare under six months. The period of life during which the liability to the affection is most marked is from the sixth to the twelfth month—that is, during the time of cutting the teeth. For this reason dentition has been credited with being a fruitful cause of the trouble, but no very definite evidence can be adduced to prove this supposition. The affected child is in most cases perfectly strong and healthy, without any definite predisposition to disease or even passing ailment, and this disposes of the suggestion that ill-health left by some feverish illness is a strong predisposing cause.

The hot months of the year are undoubtedly the favourite season for this disorder, and exposure to cold when overheated, by sitting on damp grass or lying in a draught of air, seems to be a not infrequent cause. It is seldom after an attack has developed that some blow, fall, or other injury cannot be remembered, and is credited with being the origin of the trouble, and unmerited blame is laid to the account of those in whose charge the child has been left. It is quite possible that injury may predispose to an attack, but there is no proof that it can actually cause it. Over-exertion, fatigue from too much walking, in young children, is acknowledged to be a decided danger. In spite, however, of these many suggestions, the origin of this affection is not certainly known, though it is probably due to a micro-organism. The disease sometimes occurs in epidemics.

Symptoms.

The onset is usually sudden ; a healthy child all at once becomes feverish and ill, and after this has continued for a few hours or a few days the want of power in some part is observed. Occasionally a child may go to bed feeling quite himself, and when he wakes in the morning he is found to be paralysed. The fever may be severe, and the temperature rise to 100° or even 102°, and be accompanied with sickness, diarrhœa, convulsions, and at times delirium, or it may be so slight and transient that its presence may be entirely overlooked, and the first matter to attract attention is that a limb hangs powerless and limp. This is particularly likely to occur in infants, who cannot, of course, describe their feelings. They are considered to be disturbed by teething or digestive troubles, and it may be days before it is noticed that one of the limbs is never moved. In the early stage careful observation would in most cases lead to the discovery that the affected parts are tender to touch, and that the child cries out when they are handled or moved. The amount of paralysis varies much in extent, and reaches its height in the course of the first few days. It may involve only a few muscles, a single limb, or the majority of the muscles of the body. In the latter case the child cannot sit up, nor hold his head erect ; his breathing may be weak and quick, and his cry almost inaudible. An affected limb is perfectly powerless and relaxed.

This stage of fever and developing paralysis, which seldom lasts more than a few days, is followed by a period of several weeks during which things remain stationary; the fever passes off, but the paralysis grows neither better nor worse. Then comes a third stage, during which the muscles—some or all—gradually regain their power. An important feature of the disease now becomes evident in that the affected muscles may be seen, even in the fattest children, to waste rapidly, and this is particularly marked in those muscles which are never to recover their power. During this stage nothing ails the child except the paralysis; he is bright, happy, and contented. The muscles may continue to improve up to the end of the first year; after this there is but little hope of further recovery. The affected parts continue to waste, the muscles shorten and contract, and many deformities develop in consequence. The bones of the affected parts cease to grow, and remain frail, small, and thin; the joints become distorted and displaced; the skin is ill-nourished, cold, and blue from imperfect circulation, and is often the seat of sores and chilblains. Deformities are most often seen in the legs; there may be dropped foot, the heel being drawn up and the toe pointed, or club foot, and the joints may grow bent and stiff. From paralysis of the muscles of the back spinal curvature may result.

The treatment of this complaint requires the greatest perseverance and unremitting attention, for the ultimate results are largely dependent upon it, and there are few complaints in which patience is so well rewarded.

Treatment.

In the early stages, whilst fever is present, the child must be put to bed and kept as quiet as possible. A simple fluid diet, consisting chiefly of milk, should be given, and mustard and linseed poultices should be applied along the spine, the affected limbs being wrapped up in cotton-wool to maintain them at an even temperature. A soothing fever medicine will also be of benefit:—

PRESCRIPTION 286

Bromide of potash	½ drachm.
Tincture of aconite	6 drops.
Salicylate of soda	20 grains.
Syrup of orange	3 drachms.
Water to 1½ ounces.	

A teaspoonful to be given every 3 or 4 hours to a child 1 year old, a dessert-spoonful to one of 4 or 5 years.

Even after the fever has gone the child should be kept at rest for some time, up to a fortnight or more, and as free from disturbance and excitement as possible, for there is often much weakness and prostration, which would be increased by movement or fatigue. Rest is of importance, and the inflamed nervous structures should be placed in as favourable a condition as possible for recovery.

The general health must be carefully maintained with nourishing and unstimulating food and simple tonics. For the latter purpose cod-liver oil is suitable, from 10 drops to a teaspoonful, according to age, being given three times a day, and it may with advantage be combined with extract of malt.

About the end of the first fortnight from the onset of the illness the use of electricity should be begun. At this date much may be learnt by the physician by the use of the electric current—galvanic and faradic—as to the ultimate issue of the case, and the amount of permanent paralysis that is to be anticipated. The muscles waste very rapidly, but their nutrition may be maintained and their wasting limited by the electric current until the spinal cord has had time to recover from the inflammation and return to its duties.

Electrical treatment may do harm as well as good, and should never be undertaken without professional advice and supervision ; but when once it has been started it is quite possible for an untrained person to continue to carry it out. It is very important to start it with caution and gentleness, in order to win the little patient's confidence, for violent struggles and screaming fits will do more harm than electricity will do good. The applications of the battery should be once daily, and should be continued for many months, for it is in this in particular that patience receives its reward. Gentle rubbing and massage of the paralysed part are also of great value ; they may precede the electricity, and be also practised in conjunction with it. They encourage the circulation, maintain the warmth, and improve the nutrition of the parts.

The child should be encouraged to use the paralysed part as much as possible, and, if able, should run about and purposely exercise the weakened muscles. In many cases a systematic course of exercises may be adopted in which movements are attempted that bring the muscles into play, or movements are resisted when performed by an attendant. When the patient is well enough to be up and about, he should be dressed warmly, and the affected parts in particular should be well wrapped up. The treatment of deformities which may ensue will be considered separately, but it is chiefly surgical, and consists of splints, artificial supports and appliances, and operations.

PSEUDO-HYPERTROPHIC PARALYSIS

A peculiar nervous disease called pseudo-hypertrophic paralysis is met with in children. It is an affection of early childhood, and occurs usually before the age of ten. It is known to run in families, involving the boys far more often than the girls, and is transmitted to the offspring through the mother even though she herself may never have suffered from the complaint. The essential feature of the disease is a condition of the muscles in which a progressive loss of power is accompanied by a great increase in their size, due to the development of fibrous and fatty tissue.

Symptoms.

The first symptom which attracts attention is the child's clumsiness in using his legs. He is late in learning to walk, falls about constantly from the slightest trip or jostle, walks with a straddling gait, and if he falls finds great difficulty in raising himself on to his feet again. In rising from the ground he pulls himself up by holding on to the table or chairs, or, what is more characteristic still, by pushing himself up in stages ; he starts by pushing himself up from the ground, next places first one hand, then the other, on his knees, and thus raises his body to the erect position. Certain muscles which are undoubtedly weak are noticed to be much enlarged ; they are chiefly the calf muscles and those of the buttocks, back, shoulder-blades, and arms. This weakness gradually grows worse, the muscles become contracted and produce various deformities, until finally the child becomes helpless and bedridden, and in many cases may lapse into imbecility. The disease is of very slow progress, lasting perhaps for ten or twenty years, and does not of itself in any way shorten life ; death usually is caused by some illness which attacks the child in his weak and enfeebled state.

Nothing is known that will check the disease, and there is no drug that will in any way influence its downward course. Those sufferers live longest who are best cared for and nursed. Healthy surroundings, with good food, fresh air, and as much exercise as can be taken, all tend to prolong life.

ST. VITUS'S DANCE

Chorea, or St. Vitus's Dance, is a nervous disorder in which the will has lost control over the muscles. The word chorea is derived from the Greek, and means a "dancing" or "jumping," and the disorder was named after St. Vitus because pilgrimages used at one time to be made to the shrine of that saint; but it is evident that the epidemics which then occurred were of a different nature, and much more allied to the "dancing disease," or tarantula, which was common in Italy in the Middle Ages, and was supposed to be caused by the bite of the tarantula spider. Chorea is a common disease of children, occurring in the great majority of cases between the ages of six and fifteen, but appearing occasionally in adults; it is more frequent in girls than in boys. Like other nervous disorders, it shows a distinct tendency to occur in families affected with other nervous disorders. All classes are liable to it, rich and poor; but its subjects are mostly drawn from the families of the poor, whose children are too often ill-fed and uncared for, who live in straitened circumstances and unhealthy surroundings. Those most prone to attack are the debilitated, the nervous and the excitable. There is a peculiar but well recognised connection between St. Vitus's Dance, acute rheumatism, and organic heart disease, for chorea is a very common sequel of an attack of rheumatic fever which has left in its train a permanent affection of the heart valves. Besides rheumatism, many other debilitating illnesses predispose to chorea, such as enteric fever, scarlet fever, measles, and other infectious fevers.

Exciting Cause.

The exciting cause of an attack is most commonly some severe nervous shock, such as sudden fright. A child passes through some horrible or terrifying experience, and from a day to a week afterwards the symptoms of chorea show themselves, the onset of the symptoms being either sudden or gradual. There is no doubt that many a case is brought on by over-study, especially in children who are delicate and outgrowing their strength, and whose nervous systems are quite incapable of bearing the strain of competition with stronger and healthier companions. Again, many cases can be traced to imitation, a child developing the strange movements after watching them in another. The mimicry is not, however, a voluntary act.

The symptoms may begin as an exaggeration of the restlessness or fidgetiness so common in children. The hands are constantly on the move, the position of the body and limbs for ever being varied, and the face muscles are in frequent action; the child "makes faces," screws up the mouth into grotesque grimaces, and twitches the head to one side or the other.

Symptoms.

The muscles of the hands and arms are particularly out of control, and consequently the child is constantly dropping things or knocking them over, cannot do needlework nor thread a needle, and spills the food on the way to its mouth. The involuntary movements are much increased if attention is drawn to them, and after correction or reproof for apparent carelessness. They are made worse by excitement or by any effort to restrain them. They grow gradually worse and finally attract attention, the early symptoms having often been overlooked or attributed to clumsiness or naughtiness. The hands and arms are thrown about in a purposeless and unnecessary way; if the child be asked to shake hands, the act is carried out awkwardly and with difficulty; when the tongue is put out it is found to be affected, and is suddenly withdrawn as if to avoid its being bitten. The respiration may be irregular and jerky, and queer noises are made in the throat. Occasionally the movements may be sufficiently violent to throw the patient out of bed or off a chair, and the friction with the bedclothes may be enough to cause severe sores of the skin. After a time a decided loss of power sets in, more frequently in one of the arms, which becomes weak, and the grasp of the hand feeble. During sleep all the movements cease, but unfortunately sleep is often very difficult to obtain, and the little patient becomes worn out.

Fever is very seldom an accompaniment of this disorder. Choreic children are nearly always pale and badly nourished, with poor appetites, constipated bowels, and scanty, thick urine. Their characters are changed; they become irritable, peevish, and naughty, cannot be amused, cannot attend to their work for any length of time, and may, indeed, seem vacant and weak-minded. The attack is spread over many weeks, about ten being the average; it gradually subsides, and is very liable to return without cause in the succeeding years at the same season at which it originally appeared.

One of the most serious complications of St. Vitus's Dance is heart disease, and this is not always caused by rheumatism; it may entirely pass off when the movements have subsided, but in certain cases it remains permanently. Except, however, in very severe cases, the outlook is hopeful, for the great majority of cases get quite well, and the affection leaves no evil effects in its train.

The first step should be to remove the child from all those surroundings which may have been the original cause of the trouble. He should be placed in bright, healthy, unexciting conditions, should be removed from school, and should be well fed, well cared for, and kept exceedingly quiet. Rest, both of mind and of body, is of the greatest importance. At first, for at any rate a week or two, the patient should remain in bed, and then for some time in one room. His food should be light and nutritious, and include plenty of milk and cream, and should be given frequently. Everything should be done to amuse and occupy without exciting him.

Treatment.

The drugs to be employed should be chosen according to circumstances. If the movements are violent and sleeplessness is severe, bromide of potash and chloral hydrate are indicated; 10 grains of each should be given at bedtime and repeated every three or four hours until sleep is obtained. Warm baths of long duration or frequent warm sponging of the whole body can be strongly recommended, and prove very soothing to the irritable nervous system. When rheumatic symptoms are present, or have preceded the attack, salicylate of soda should be tried, 5 grains being given every three or four hours, and this may with advantage be combined with the same dose of bromide of potash. Exalgin, 1 grain three times a day, is also a useful medicine; it can be obtained in tabellæ of chocolate. Arsenic is, however, the drug found most generally useful, and it must be given in large doses, 2 or 3 drops of the solution, well diluted with water, three times a day after food. The size of each dose should be gradually increased until benefit is obtained, or until such poisoning symptoms as swelling of the eyelids, nausea, or stomach-ache appear. Such treatment naturally requires great care. Ergot is another drug often recommended; it should be taken in large doses, a teaspoonful of the liquid extract with water, two or three times a day. Lastly, in all sufferers who are pale and sickly-looking, nothing does more good than a combination of steel wine and cod-liver oil, a teaspoonful of each, three times a day after meals; the steel improves the blood, and the cod-liver oil feeds the enfeebled nervous system. In long-continued, obstinate cases, a change of air to the seaside—but not sea bathing—is advisable, and a course of carefully regulated gymnastic exercises combined with general massage often gives good results.

Throughout the illness it must be kept in mind that this is a nervous complaint, and that careful management and discipline are requisite. The child must be controlled with a firm though kind hand. In not a few instances the mother does not prove the most judicious nurse.

EPILEPSY

Many cases of epilepsy start in the years of childhood, and it has been estimated that one out of every four epileptic persons first suffered from fits before the age of ten. Whenever, therefore, a child suffers from convulsions, the anxious question is sure to arise whether they are epileptic in nature, and will continue and ultimately end in the dire results so often produced by this disease. If the convulsions are produced by some perfectly evident condition, such as teething, worms, digestive disorders, or the poisons of severe disease, there is no reason to fear the future, for in epilepsy there is usually no definite cause of irritation which sets up the convulsion. If no cause is found, and the convulsions are repeated at comparatively long intervals, there is more cause for anxiety, for the epileptic condition may be developing.

This is especially probable if there are signs of brain trouble, or if there is a family history of epilepsy or other nervous disorders, for the influence of heredity is undoubtedly strong in this affection. Although, therefore, there is the possibility that a child who suffers from convulsions may grow up to be epileptic, yet the great majority lose the tendency to "fits" as they grow up, and the nervous system grows more stable and less sensitive to irritation.

As we have explained, in true epilepsy no evident cause can be discovered. The first fit is sometimes traced to a blow or other injury to the head, to a severe or sudden fright, or to exposure to the direct rays of the sun. There is no doubt that it frequently follows attacks of severe illness, as scarlet fever, measles, and whooping cough, but whether they can be looked upon as causes is not certain.

The symptoms of epilepsy in childhood have nothing which is distinctive from the same disease in the adult (Vol. I., p. 358), and they need not therefore be considered in detail.

Treatment is of great value in the young: it may be the means of checking the disease and averting the terrible results produced by confirmed epilepsy. The child should be encouraged to live an active life, and should be placed in healthy surroundings. Over-eating and slothfulness are most injurious; constipation must be guarded against, and the bowels must be kept in regular action. The hours of sleep should be reduced to as few as will maintain health, for much sleep is liable to induce the fits. The drug treatment is similar to that for adults, and includes chiefly the iodide and bromide of potash (Vol. I., p. 363).

Treatment.

CONVULSIONS

Convulsions are violent contractions of muscles, occurring in paroxsyms. They may affect a part or the whole of the body, and are usually accompanied with loss of consciousness. Although they are met with at all periods of life, they are far more common in infancy and childhood, especially during the first two years of life. They are a symptom of some disturbance of the nervous system, and occur in children under very similar conditions to delirium in adults. It is usual to consider convulsions as a separate and distinct disease, but it is far more accurate to look upon them as merely a symptom of a great variety of affections which involve all parts of the body. They must be regarded also as a serious symptom, for a single attack may occasionally prove fatal, though many children, even after repeated convulsions, do not seem to suffer in health, and in the majority of cases recovery is rapid and complete. The importance of convulsions also depends much upon their exciting cause. This may be either serious or trivial, and the convulsions correspond. The methods of treatment to be adopted also depend much upon the cause of the trouble, and it will be therefore necessary to consider somewhat fully the various conditions which may give rise to convulsions in infancy and childhood.

The hereditary tendency to convulsions is sometimes very marked; it is transmitted from parents who have suffered from many nervous complaints, and especially epilepsy. Alcoholic excess in the parents produces a strong liability to convulsions in the offspring. A similar tendency is believed to descend from parents who are feeble and debilitated, or who have married at too early or too advanced an age. The disease also runs in families, and there is a case on record in which convulsions were produced in father, mother, and children by the slightest cause, notwithstanding that the children had been brought up separately and educated differently. A large-sized head has been regarded as predisposing to convulsions, and popularly

Causes.

it is considered as a sure sign, especially if the forehead be prominent. This, however, is not true, unless the size of the head is due to the presence of rickets. In this disease, as has been explained elsewhere (p. 32), the head is disproportionately large, and there is no doubt that rickets is one of the strongest predisposing causes, and that the rickety condition is exceedingly common in children who suffer from convulsions.

All conditions which produce bloodlessness and extreme debility excite a proneness to this disorder. Infants may be affected shortly after birth, from various causes. It is said that if the mother receives a great shock, a severe fright, or is subject to any other strong mental emotion when pregnant, the child is often attacked by convulsions soon after birth. There are strong reasons for believing that even before its birth the child may be convulsed ; it is not uncommon for the mother to be distressed by its violent movements, which may occur in paroxysms, and are considered to be one of the causes of stillbirth. The pressure exercised upon the head of the infant during its entrance into the world, and the imperfect circulation through the brain which accompanies malformation of the heart, are the chief causes of convulsions during the first few days of life. During the first year they may not unfrequently be traced to the milk of the mother or nurse disagreeing with the infant, or having been disordered temporarily by fright, passion, or suffering. With bottle-fed babies, or in older children, improper feeding, overfeeding, and disturbances of digestion are common causes, by setting up intense irritation and acting indirectly on the nervous system. Intestinal worms act in a similar way. These nervous troubles are frequent during the process of teething ; the distension and pressure of the advancing tooth upon the gums occasion so much irritation that convulsions are set up. Milder symptoms may appear and give warning of worse ; there may be simple irritability and restlessness, starting and fright at the slightest sound, crying out in the sleep, grinding of the teeth, twitchings of the hands, feet, or face, jerking movements of the head, arm, face, or eyes, and finally general convulsions.

Convulsive seizures are also common in all feverish diseases, especially the infectious fevers, as scarlet fever and measles, and in such circumstances often replace the shivering fit or rigor which would occur in an adult. Whooping-cough also is frequently complicated by these attacks. Many mental conditions may act as exciting causes, such as shame, anger, and fright. A loud noise, sudden exposure to a bright light, hot, impure air, or severe cold, may also bring on an attack. Lastly, convulsions may result from various diseases of the brain, spinal cord, and their coverings.

Symptoms.

The mode of onset varies a good deal. In the majority of cases the child is dull, heavy, and feverish for a day or two previously, or he may be restless and irritable, and show some of the mild nervous symptoms previously referred to. In other cases there are no precursory symptoms; the child is attacked when perfectly well, occasionally in his sleep; or suddenly in the course of other diseases, with no circumstance which would lead us to anticipate this trouble. When first seized, the child has a bewildered, frightened look; his eye expresses terror, and may be agitated by irregular, jerky movements. Sometimes the eyes are turned upwards, sometimes downwards; and when the turning upwards is excessive the coloured portion is hidden, and there may be a terrible squint, giving the face a frightful expression. The muscles of the face twitch and jerk in an irregular and distorted fashion, the jaws may forcibly close, the teeth may be ground, froth collects about the lips, and the breathing is short, irregular, and hissing. The spasms may become more general and spread from the face to the trunk and the extremities. The head is thrown strongly backwards, or to one side, or is rapidly twisted from side to side; the muscles of the back grow rigid, or act with sudden and irregular jerks; the arms are bent up, then thrown about irregularly; the hands are clenched with the thumbs turned into the palms, and are twisted or forcibly bent. The legs may be similarly affected, but less severely, and the feet are generally bent upwards. During the fit the pulse is very rapid, from 100 to 140, and often irregular. The face becomes pale or dusky, the head is hot, the feet are cold, and a clammy moisture soon breaks out over the body, but particularly upon the head and face.

In these severe attacks consciousness is totally lost; the child recognises no one, and neither sees nor hears nor feels, and the urine and motions may be passed unconsciously. The duration of the fit varies very much, lasting but a few seconds in some cases, in others from five minutes to many hours. When the convulsive movements cease the child falls into a state of general relaxation; the face is white, the eyelids are closed, the limbs limp, the respiration quiet and regular, the pulse slower and weak, and sleep supervenes. From this sleep he awakes feeble and exhausted, but generally conscious and intelligent.

These are the phenomena of a severe fit, but it is often far less violent and may last but a few seconds, or it may be limited to one part of the body only. A common localised form of convulsion is that met with in "child crowing." There may be but one fit, but it is more usual for others to follow at intervals of from half an hour to a day or two; they become weaker, the intervals longer, until they cease altogether. They occur more frequently in the night than in the day.

Treatment.

In treating an attack of convulsions, our first duty is to deal with any exciting cause which may be present. Tight binders and clothing should be removed, the child placed in the recumbent position, and given plenty of fresh air. If the teeth are being cut and the gums are evidently painful and swollen, they may be lanced. If the stomach is overloaded, or indigestible food has been taken, an emetic may be useful, a teaspoonful of ipecacuanha wine being a suitable dose, or a good purge of 1 or 2 grains of calomel will do good. The attack may sometimes be checked by the inhalation of a few drops of chloroform, by dashing cold water over the face and chest, slapping them with a wet towel, or by applying smelling salts or ammonia to the nostrils.

In many cases it is impossible to discover the cause; in such cases —and, indeed, as a routine treatment in all cases—it is right to prepare a warm bath as quickly as possible and put the child into it. The water should be of a temperature of 96° to 97°—that is, not hot; the child should be kept in it for a few minutes and then carefully and rapidly dried, wrapped up in a blanket, and put to bed. The room should be cool and airy; the diet simple and light, consisting chiefly of milk. Every care must be taken to ensure perfect quietness for the child, whose nervous system has been severely disturbed. He should be placed in a darkened room, and nothing done to amuse or excite him if he will keep quiet; the longer he sleeps the better will he be. If the convulsive attacks are repeated, a sedative mixture must be given in the intervals:—

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Bromide of potash	½ drachm.
Tincture of belladonna . . .	20 drops.
Syrup of orange	3 drachms.

Water to 1½ ounces.

A teaspoonful to be given every 3 hours to a child 6 months old.

This may be given more frequently if the fits are severe, and larger doses are necessary for older children. A grain or two of hydrate of chloral may be added to each dose, but the effects must be watched, as this will cause great drowsiness and perhaps sleep.

DISORDERS OF SLEEP

For some weeks after birth an infant's life is divided between feeding and sleeping ; it awakes when hungry, and falls asleep again when satisfied ; so that it spends from eighteen to twenty hours out of the twenty-four in complete rest. In this there is great advantage, not merely in facilitating digestion, but from the repose afforded to the brain and nervous system. The more the infant sleeps the better ; constant visits from baby admirers and spells of being on show are sure to do harm : they irritate the nervous system, and often make the child restless and fretful, leading to much trouble for both baby and nurse, and perhaps to many nervous affections later in life. By degrees the wakeful moments lengthen, and as it is desirable that these should occur during the day rather than the night, some little effort may be made to attain this. At about three weeks or a month old, if encouraged to stay awake about an hour before bedtime, the child will sleep better at night. After each meal it ought to be laid in its cradle and left quiet for at least half an hour. Whilst lying in its cradle it should be kept warm and guarded against draughts. The bedding should be warm and soft, without being too soft, nor should the bedclothes be too heavy or too warm. If the weather is very cold, a hot-water bottle should be placed in the cot, well covered, and not too close to the body. The infant should be placed comfortably on its side, with its limbs free and its face uncovered, so as to allow free access of air. It should never be accustomed to being rocked to sleep, for the less effort that is made to put it to sleep the better. Young children are so completely creatures of habit, that they may be taught anything, and if they are accustomed to go to sleep because they are placed in their cots, much trouble will be saved to both child and nurse in the future. Bad methods of early training are sure to lead to much trouble ; the child requiring rocking and hushing, and refusing to go to sleep unless its nurse is close at hand.

Sleeplessness in an infant often means illness, and it is most important that this should be recognised, and the cause at once discovered and corrected. Perhaps, however, the child may be simply uncomfortable, and wants its position changed; the bed may be rough and uneven, its feet may be cold, it may have eaten too much, or it may be teething. One of the most common causes of restless sleep is feverishness, and this can be detected by the use of the thermometer.

A feverish child tosses uneasily in bed, and is only content when it is being rocked, fondled, or "walked" in the nurse's arms. Rickets is another fruitful source of restless sleep; the body gets hot and the head perspires, and sleep is only obtained after all the bed clothing has been kicked off, though this may also end in a severe chill unless the room is kept comfortably warm. A child with enlarged tonsils and adenoids has usually much difficulty in breathing through the nose, and yet upon dropping off to sleep the mouth naturally closes, which leads to sudden awakening with a sensation of fright and suffocation. A child suffering from this complaint lies with the head thrown back and the mouth open. Any difficulty of breathing caused by heart or lung trouble leads it to sleep with the head and shoulders raised high on the pillow. If it lies persistently on the face, it is probable that the eyes are painful, and cannot bear the light. Sudden starting up from sleep with a scream is one of the symptoms of affections of the joints, especially hip disease, and is due to the painful surfaces of the joint coming in contact with one another when the muscles become relaxed in sleep.

Nightmare or night terrors are not an uncommon trouble with nervous and excitable children. They retire to rest in the best of health, and apparently perfectly comfortable, and yet an hour or so later they wake up screaming in terror with imaginary troubles filling their minds. Such attacks are usually due to stomach disturbance, and are caused by indigestible food or a meal too near to bedtime. They may also occur after an excitable evening spent at a party. The only treatment necessary, as a rule, is to soothe the child to sleep again with a little petting, but if attacks should occur frequently the nervous system may require soothing. A placid life, with restful surroundings, and a 5-grain tabloid of bromide of potash, with a little syrup at bedtime, for a few nights, may be recommended. The bowels should be cleared with a simple aperient, and the diet carefully supervised. The question of giving children sedatives is of importance; they should certainly never be given without absolute necessity, and it is well carefully to avoid anything like an opiate, for children tolerate opium and all its preparations very badly. Syrup of poppies, soothing syrups, paregorics, and all such stuffs should never be given at all, and it is only the most ignorant or untrustworthy nurses that would ever make use of such things to obtain relief from the worry of a fretful baby, or to produce quiet and sleep. If the child is really restless and uneasy, without ascertainable cause, it may be put into a warm bath for a few minutes, which will soothe it and often cause it to fall asleep.

HEADACHES

Amongst children headaches are a very frequent complaint, and interfere much with their happiness and powers of work. Many children are perfectly happy and well so long as they are at play and amusing themselves, and yet directly they begin their daily tasks, whether it be with books or needlework, they complain of pain in their foreheads or in their eyeballs. This sequence of events naturally leads their parents or teachers to look upon them as lazy, and as attempting to escape from uncongenial duties by malingering. But in many cases that is certainly not so, and unless some trouble be taken to discover the cause of the headaches, much unnecessary suffering is permitted, and the seeds of permanent trouble in later life may be sown.

Different Forms of Headache.

One of the most fruitful sources of children's headaches is eye-strain. Naturally this does not affect young children, who do not use their eyes much for near objects; but as soon as they are old enough to begin to read or do needlework, the trouble begins. In the early part of the day they may get on quite well, without inconvenience. But after a time they complain that the printed letters run together and grow indistinct, and the eyes swim with tears. If the work is continued, the balls of the eyes grow very painful, and the pain spreads to the forehead and may even cause vomiting. This affection is most frequent in long-sighted children and in those affected with astigmatism (Vol. II., p. 51); these conditions require much use of the small muscles to accommodate the eyes to near work, and after a time the muscular strain thus required is followed by severe pain. It is also a frequent trouble in those children who are out of health and generally below par, the explanation of which is that the muscles are then less able to bear any strain. Symptoms of this sort ought at once to lead to a suspicion of something being wrong with the eyes, and the child should be taken to an oculist to have these organs carefully tested. If either long-sight or astigmatism is discovered, it can be corrected by the use of suitable spectacles, and many a case of severe and frequent headaches is cured as by a charm as soon as they are made use of. It does not necessarily mean that children are to be condemned to wear glasses for the rest of their lives, for as the health becomes restored by good food and a judicious mode of life, the muscular tone may be so much improved as to enable them to discard their glasses.

Many severe neuralgic headaches in childhood are due to painful or decayed teeth which, by acting on the nerves, set up the pain in the head. Such cases are completely cured by the removal or stopping of the offending teeth. In rapidly growing children whose development is so fast as to outgrow their strength headaches are also met with ; the irritation and exhaustion caused by work act upon the nervous system, and set up the pain in the head. In such cases very little work may be overwork, and a healthy holiday in fresh country air often cures the trouble. These children are frequently pale and anæmic, which is a definite indication that a carefully regulated course of iron is required to restore the blood to a healthy state.

Another common cause of headache is digestive trouble. The appetite is bad, the tongue furred, the breath disagreeable, and the bowels are constipated. Under such conditions headaches are very liable to develop, and require for their removal careful dieting, with a limited amount of animal food and a regular action of the bowels, encouraged if necessary by mild aperients.

A very troublesome and constant pain in the head sometimes accompanies chronic nasal catarrh and the obstruction of the air passages caused by adenoids. The pain then is chiefly felt at the temple and top of the head, and is unaccompanied by furred tongue or gastric disturbance. By removing the adenoids and curing the catarrh relief is soon obtained.

A rheumatic tendency often shows itself in childhood by causing pain in the head. Tender spots are found by pressure in various parts of the scalp, and damp air and changes of weather always make the pain worse. Such attacks often follow influenza and other feverish complaints ; they are cured by a mixture containing salicine (*see* Rheumatism, p. 46), and by the local application of warmth.

True attacks of "sick headache" or megrim are not unknown in children, although they do not occur with such frequency as in adults. The symptoms and treatment are, however, similar (Vol. I., p. 570).

In older children, especially in girls about the age of puberty, hysterical headaches are not uncommon. The pains occur in various parts of the head, appear at times to be excessively severe, and are often accompanied with inability to bear bright lights. They are liable to attack those whose mothers are similarly affected, and may be imitative in some cases, having their origin in a desire to obtain sympathy and notice. Lastly, there are the headaches which accompany disease within the skull—affections of the brain and its membranes.

Treatment.

The treatment of headache in general must first be directed to the removal of the cause, and this is not always easy to discover. Over-fatigue of both mind and body should be avoided, and much time should be spent in the open air amidst healthy surroundings. The diet should next be attended to, over-eating prevented and unsuitable food forbidden. If the pain is severe, bed is the best place; cold to the head may be tried, and some of the drugs recommended for headache in adults may be administered in suitable doses. Antipyrin, phenacetin, and citrate of caffeine are useful to subdue an attack, 1 or 2 grains being the dose. In stomach headaches an emetic may give relief, a teaspoonful of ipecacuanha wine being employed.

AFFECTIONS OF SPEECH

Towards the end of the first year or the beginning of the second, it is usual for the infant to make attempts to utter words, and if he reaches eighteen months or two years without doing so there is cause for anxiety. Backwardness in talking often goes with slowness in learning to walk and with delayed teething. In such cases rickets is a common explanation, or the child may have suffered from some severe illness which may hinder these acquirements. Occasionally children appear to be simply too lazy to speak, and are content to express their meaning by signs. When a child does not talk long after the usual time, there is naturally great anxiety on the part of the parents to know the cause. There may be (1) some defect in the brain, the intellect being deficient; (2) the child may be totally deaf, and the dumbness follows as a natural consequence; (3) there may be some malformation in the mouth or vocal organs; or (4) there may be some difficulty in speaking, as stammering or stuttering.

DEAF MUTES

A child may be born deaf, or may become so from disease before he has learnt to talk. If total deafness develops before the age of six or seven, dumbness will naturally follow, for, being unable to hear, the child cannot be taught to speak. Such children are called deaf mutes. During the first six or even twelve months it is impossible to be sure whether total deafness is present or not; but if, after this time, a child has never spoken a word nor attempted to do so, and yet shows no want of intelligence in other ways, and no imperfect physical development, there are strong reasons for believing that deafness is the cause of the absence of speech. Even the difficult task of teaching deaf children to speak has been accomplished by a system of signs, the manual alphabet, and, best of all, by the oral method; and deaf mutes are now educated to a fairly high standard. The oral method is carried out by speaking to the deaf person, who learns to read the lips and observes, by both sight and touch, how his teacher speaks; then by imitating his movements he learns to speak himself, and finally acquires the power of writing and reading.

MALFORMATIONS CAUSING DUMBNESS

The malformations which may interfere with speech are many. There may be a very high and pointed roof to the mouth, which is common also in imbeciles; or there may be a cleft palate, or the tongue may be tied down to the floor of the mouth. But it is doubtful if the last condition can do more than prevent the pronunciation of certain words. Enlarged tonsils and adenoids may also cause defective enunciation, as well as severe deafness. Paralysis, especially that following diphtheria, has sometimes been known to cause dumbness.

STAMMERING

Stammering does not usually show itself sufficiently to attract attention under the age of six or seven, and is much more common in boys than in girls. It usually affects those who have been overworked or underfed, who have had great nervous strain or excitement, or who belong to nervous families. It may follow a severe illness, be purely nervous or hysterical in origin, or be caused by some affection of the central nervous system. Many cases are incurable; others after prolonged and careful training recover. Sufferers should carry out breathing and speaking exercises, and the general health should be improved by good food and fresh air.

MENTAL AFFECTIONS OF CHILDHOOD

Mental weakness may show itself in young children in all grades of intensity. Idiocy or imbecility may be present at birth from an ill-developed brain, or may come on later in childhood at the time of the second dentition or puberty, or may be produced by some injury to the brain at birth or later, or may follow a severe illness, or be left by convulsions. The want of intellect is discovered early, even when a few months old, for the child takes no notice of surrounding objects, does not recognise his mother, and later does not play with his toys.

Cretinism is a peculiar form of idiocy which is chiefly met with in Switzerland, but is not unknown in this country. Cretin children are dwarfs, with large hands, heavy faces, tongues too big for their mouths, pot bellies, and deficient or diseased thyroid glands.

Imbeciles should usually be trained and educated away from home at special institutions, where others similarly affected are being trained, for at ordinary schools they are neglected and bullied, and at home they are either spoilt or left to look after themselves. Some cases have been improved by removing a portion of the bones of the skull, so that room may be given to the brain to increase in size. Cretinism is much benefited by small doses of thyroid extract, continued for long periods; and many other conditions of stunted growth, of both body and brain, may receive relief from similar treatment.

BLINDNESS

It is but few who are born blind, but when this occurs the absence of sight may be due to an opacity of the lens (cataract) which gives to the pupil of the eye a white or bluish white appearance, or it may be caused by inflammation of the iris or obliteration of the pupil. Many cases of blindness are the result of the acute inflammation of the eyes (ophthalmia neonatorum) set up shortly after birth. These conditions can be at once discovered by a careful examination of the eyes, but disease of the deeper parts and of the nervous structures is only discovered later, sometimes almost by accident.

CHAPTER LI

DISORDERS OF THE RESPIRATORY ORGANS IN CHILDREN

Child-crowing — False Croup — Laryngitis—True Croup—Bronchial Catarrh—Catarrhal Pneumonia—Lobar Pneumonia—Consumption—Pleurisy and Abscess in the Chest—Asthma—Heart Disease in Infancy.

CHILD-CROWING

SEVERAL entirely different complaints have been described under this name, and the confusion thus caused has been intensified by using the word "croup" to indicate either an acute catarrh of the larynx or diphtheria of that organ.

In order to elucidate the matter, let us begin by stating that many infants from birth make a peculiar crowing noise when they draw in their breath, the noise being more marked when they cry; in some cases there is also a tendency to choke when at the breast or taking the bottle. This condition seems to be of the nature of a spasm, and sometimes creates alarm, but although its true cause is unknown, it is not dangerous to life, and after getting better and worse for some months it gradually subsides, and has nearly always disappeared before the child is two years old. No treatment seems to have any effect upon it.

Child-crowing proper, also called laryngismus stridulus, is a true spasm of the vocal cords, and is not dependent on any catarrh or inflammation of the larynx. A spasm of the vocal cords commences with a long-drawn breath with hoarse sound, followed by a sudden interruption to the breathing, or "catch in the breath." It is a disorder of early infancy, not occurring usually before three months of age, nor after two years. This is the period of life when rickets is most common, and, in fact, child-crowing is associated with that disease to a striking extent, so much so that the connection cannot be purely accidental. Rickets is therefore an important factor in the production of child-crowing, although it must be admitted that children who are not rickety also suffer from it, and it is met with not unfrequently in otherwise healthy children during dentition, and at the onset of one of the eruptive fevers, especially measles.

Cause.

The direct cause of this complaint is not clearly understood. In some cases it appears to be a reflex spasm, set up by some irritation, such as dyspepsia, dentition, or the presence of adenoids, acting on the susceptible nervous system of a rickety child, which is apt to discharge uncontrolled nerve energy on the slightest provocation. In other cases the irritant exists in the blood, and is of the nature of a poison absorbed from the stomach and intestines and due to disorders of digestion, bad feeding, and constipation.

Symptoms.

The symptoms vary according as the attacks—which may occur at any hour of the day or night—are mild or severe. In day attacks, which are by far the more common, the child on the occasion of some excitement is seized with a stoppage of the breath, and makes a crowing noise every time he attempts to draw it in. The breathing temporarily ceases, but beyond remaining quite motionless for an instant he does not seem distressed. Suddenly a deep, long breath is taken, and the attack is over, respiration then proceeding naturally and quietly. Sometimes such crowing will continue for days, ceasing, as a rule, during sleep, but not invariably.

In severe cases the attacks may be really distressing. After the hoarse inspiration, the breathing suddenly stops, the child remains with his mouth open and nostrils dilated, the muscles of his face rigid and motionless, the eyeballs glistening and staring, the countenance dusky and finally blue and livid. Twitching movements of the arms often occur, the pulse stops, and the child seems on the point of losing consciousness, when, after about ten seconds or more, either spontaneously or after energetic rubbing and slapping the skin or the use of cold water, a long-drawn inspiration occurs, and at the same time colour and consciousness return. In other cases, the blueness is followed by extreme pallor, and an attack of convulsions of short duration, during which the breathing is restored. After the attack ceases, the child often falls asleep for a short time, and wakes as if nothing had happened. The attack may shortly be followed by others, and it sometimes happens that the child dies in one of them, in spite of all attempts to restore him to life.

Between the slight and the most severe cases there is an almost infinite series of gradations, but in all the attack commences with a spasm of the muscles which shut the vocal cords, and extends to the other muscles concerned in the act of breathing, and very frequently to those of the hands and feet. The duration of each separate attack varies from a few minutes to a few seconds, the whole illness lasts weeks or months, and in children affected with rickets may only come to an end when this disease is cured. The features which distinguish child-crowing from false and true croup will be given under the latter disease (p. 136).

Child-crowing must not be considered a trivial affection, however slight it may appear. It is never certain that general convulsions may not follow, or even that rapid death may not happen. On the other hand, it must be remembered that many slight cases pass off entirely without any complications, especially those occurring in connection with difficult dentition or bad feeding, and that they improve rapidly as soon as those conditions are removed.

Treatment.

Due attention must be paid to the complaints with which child crowing is associated, such as fevers, rickets, and dyspepsia; while to calm the irritable nervous system and keep the attacks in check, bromide of potassium 5 grains, with hydrate of chloral 2½ grains, in a teaspoonful of sweetened water, may be given every six hours to an infant six months of age. Should this prove ineffectual, extract of belladonna, ⅙ to ⅓ grain, is useful, or 1 drop of solution of acetate of morphia—not more, for infants are extremely susceptible to this latter drug. When the urgency of the attacks has subsided, the child's health must be built up, special attention being given to the nervous system by means of such drugs as arsenic, 1 to 2 drops of Fowler's solution in water after meals, or phosphorated cod-liver oil, half to one teaspoonful. The diet must be regulated, and a change to the seaside obtained if possible. During the attack, if severe and repeated, every effort must be made to stimulate the skin by dashing cold water on the face, shaking, and fanning, and it is as well to have a hot bath ready into which the child may be put, while cold water is at the same time applied to the face.

FALSE CROUP

Spasmodic laryngitis, or false croup, is a spasm of the vocal cords associated with slight catarrh of the larynx or of the throat. It only occurs in early childhood, generally in children above two or three years of age, of both sexes, who have adenoids or enlarged tonsils, but who are otherwise well nourished. It appears to run in certain families, being to some extent hereditary, and perhaps connected with a peculiar formation of the larynx.

Symptoms.

This affection commences with a slight hoarseness or cold in the head, which during the day-time does not cause any distress to the child, who goes to bed comparatively well. In the early hours of the night, however, he awakes with a loud, barking, "croupy" cough, while at the same time the breathing becomes difficult and noisy. He sits up in bed and struggles for breath, with congested face, dilated nostrils, staring eyes, and distressed look, the noisy breathing being interrupted from time to time by paroxysms of loud "croupy" coughing, while his chest heaves, the veins of the neck become swollen and the skin bathed in sweat. When the attack seems at its worst, however, the breathing gradually becomes less noisy and easier, the cough less harsh, and the child, tired out and exhausted, falls to sleep in his mother's arms. The next morning nothing remains but a slight hoarseness and clanging cough, the child seems happy and well, and wants to get up. But at night the alarming scene is repeated, and perhaps for some three or four nights the attacks may recur. Though these attacks are alarming to the friends and relatives, partly on account of their occurring at night and partly by reason of the fear with which all forms of "croup" are regarded, they are hardly ever fatal, and then only to rickety children with deformed chests. The child gets less and less liable to them as he gets older, and they usually cease entirely before he grows up.

Treatment.

During the attack hot sponges or linseed poultices should be applied to the chest, and an emetic of ipecacuanha given (5 to 10 grains of the powder or one or two teaspoonfuls of the wine, repeated after ten minutes). A steam kettle is also useful. Children subject to these attacks must be protected from catching colds, which should be always carefully treated.

LARYNGITIS

Children are liable to catch a cold in the throat, which may also affect the larynx and give rise to the condition known as simple laryngitis, or simple catarrh of the larynx. As a rule, they are not ill, or very slightly feverish, the voice is weak and hoarse after crying, there is a slight cough, which is loose and not metallic or "croupy." The complaint lasts a few days and then disappears, and very rarely develops into croup. The treatment is to keep the child in the warm room. To older children warm milk mixed with Ems water may be given, and sprays of a 5 per cent. solution of salt and—if hoarseness is obstinate—of a 1 per cent. solution of tannin. To younger children a mixture such as the following :—

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Citrate of potash	½ drachm.
Solution of acetate of ammonia	2 drachms.
Ipecacuanha wine	½ drachm.
Syrup of mulberries	½ ounce.

Water to 1½ ounces.

A teaspoonful every 4 hours.

TRUE OR INFLAMMATORY CROUP

When catarrh of the larynx is severe and the secretion is thick and tenacious, it constitutes croup. All cases of croup are extremely serious, and must be regarded with the greatest suspicion, as they may turn out to be really diphtheria, which disease, when it attacks the larynx, is sometimes called membranous croup, or diphtheritic croup. Owing to the ambiguity of terms, it is useful to retain the name inflammatory croup for the disease we are about to describe—a better name than catarrhal laryngitis, which might be confused with the mild affection we have just called attention to. True or inflammatory croup differs from false or spasmodic croup, inasmuch as there may be no violent attacks only occurring at night, although in many cases all the symptoms are liable to be worse towards evening. In each disease there is both catarrh and spasm, but in true croup the former predominates, and in false croup the latter. Inflammatory croup is essentially a local affection of the larynx, and is not contagious, being mostly caused by exposure to cold winds after living in overheated rooms. It usually attacks children between the ages of one and seven years, and boys more frequently than girls.

The complaint begins with feverishness, running at the nose, hoarseness, and cough which from the first is hard and hoarse. After a day or two the hoarseness increases, and breathing becomes rather noisy and less easy than usual. Gradually the symptoms become more marked, the voice is almost lost, the cough is irritable, "brassy," or "croupy," hard and painful. The throat may be painful when touched, and is seen on inspection to be red and swollen, but there are no white patches of membrane as in diphtheria. The distress and difficulty of breathing increase, the child has to be propped up in bed, and uses all his efforts to breathe, he is restless and thirsty, continually asking for water, which he is too breathless to drink. The fever is variable, usually 100° to 101°, the pulse quick, the skin moist and the forehead bathed in sweat. Sometimes attacks of suffocation threaten, but they are not so severe as in diphtheria, and pass off after a fit of coughing, leaving the child more comfortable and inclined to sleep. In other cases they threaten life, and are repeated continually, and gradually exhaust the little patient; and they may become so urgent that the operation of tracheotomy or "intubation of the larynx" is necessary to avert death. If in these circumstances help be not at hand, the child becomes poisoned by the carbonic acid of his own lungs, his breathing energy is paralysed, and while breathing becomes less difficult it becomes more feeble. He grows pale and cold, with an icy sweat on his forehead, his senses become dulled, and he either dies suddenly during a suffocative spasm or expires peacefully in a state of exhaustion. If he is over two or three years of age, the strong probability is that he will recover, especially from mild attacks, without operation.

Symptoms.

As soon as any symptoms appear in a child which point to an affection of the larynx, such as hard, dry cough, means must be taken to arrest the progress of the inflammation, and to calm the cough and allay the difficulty of breathing. The child should be placed in a room the temperature of which is kept at 60° to 65° F. both day and night. If the attack threatens to be severe, he should be put in his cot, which should be curtained round by means of sheets stretched over a clothes-horse. Into this improvised tent steam should be admitted either from a kettle on the fire with a long tube attached to the spout (Fig. 95, p. 94), or by a suitable apparatus heated by a spirit lamp. Some friars' balsam, or solution of carbolic acid, may be mixed with the water in the kettle. A steam spray, which impregnates the air with a warm solution of carbonate of potash or chloride of ammonium, two teaspoonfuls to 1 pint, is also useful. These

Treatment.

salts have the property of thinning the mucous secretion in the larynx. Care should be taken that the air inside the tent does not become too hot; a thermometer placed inside should not register above 70° F. Heat should be applied to the throat by sponges or spongio-piline wrung out in hot water, and continually renewed. Older children may have a mustard poultice, or tincture of iodine may be painted on the front of the throat, and hot linseed poultices applied. A mustard foot-bath may have a very good effect in slight cases, and even in severe ones it may be employed. To strong children, as soon as there are any signs of obstruction to the breathing, an emetic should be administered. Five grains of powder of ipecacuanha in syrup of oranges may be given every ten minutes till vomiting is produced, or sulphate of copper ¼ to ½ grain in water, repeated in a few minutes. This measure is very successful in easing the breathing and producing free expectoration, but if it fails to give relief it is useless to repeat it; and in later stages, when the breathing is embarrassed and the child is becoming blue, it does harm by exhausting him. The most useful medicine is antimony, in the following prescription :—

PRESCRIPTION 289

Citrate of potash	1 drachm.
Solution of acetate of ammonia .	3 drachms.
Antimonial wine	1 drachm.
Syrup	½ ounce.

Peppermint water to 1½ ounces.

A teaspoonful every 2 or 3 hours for a child 2 years old.

Apomorphine is another drug which promotes a free secretion from the larynx, and may be given in combination with ipecacuanha, thus :—

PRESCRIPTION 290

Hydrochlorate of apomorphine . .	⅘ grain.
Wine of ipecacuanha . . .	½ drachm.
Syrup of tolu	3 drachms.

Water to 1½ ounces.

A teaspoonful every 4 hours for a child between 2 and 4 years of age.

This treatment, combined with a diet consisting only of warm milk and barley-water, must be persevered in, in the hope that relief may ensue and the urgent symptoms abate. The most careful watch should be kept for dangerous signs, indicating the necessity for operative interference. Extreme difficulty of breathing does not by itself call for immediate operation, but when added to great distress and restlessness, and almost complete disappearance of the voice, it means that no time must be lost in giving relief. Delirium or drowsiness with great pallor also point to the same conclusion. The question whether an operation is urgently called for or may be delayed in the hope that improvement may take place, is further complicated by the fact that it is sometimes difficult to be absolutely certain whether a given case is one of inflammatory or of diphtheritic croup, which latter disease more urgently calls for the performance of tracheotomy. As a rule, there is a patch of membrane to be seen in the throat or on the tonsils and palate, in cases of diphtheritic croup, and there may be albumen in the urine.

To enable readers to grasp more easily the differences between the various forms of croup, we append a synoptical table, adapted from the work of Drs. Rilliet and Barthez :—

Child-crowing	*False Croup*	*True Croup*
Attacks children under 18 months of age.	Extremely rare in children under 1 year.	Occurs at all ages.
No feverish cold.	Preceded by fever and catarrh.	Fever variable.
First attack either by day or night ; as many as 20 may occur in 1 day.	First attack during night. At most 5 or 6 during the illness ; usually only 1 or 2.	All symptoms are worse at night.
No cough ; attacks consist of noisy breathing.	Harsh, brassy cough ; breathing not very noisy.	Harsh, noisy breathing, becoming more difficult.
Attacks last some seconds.	Attacks last several minutes.	The illness becomes progressively worse.
Health good in intervals.	Cough and fever often remain.	
Attacks repeated at irregular intervals, often after a week or month.	Attacks repeated during 2 or 3 days, at most 8 to 10.	
Convulsions common.	Convulsions rare.	Convulsions rare.
Often fatal.	Very rarely fatal.	Very often fatal.

BRONCHIAL CATARRH

Catarrhs of the windpipe and bronchial tubes are among the most common of children's disorders. Owing to the narrowness of these tubes and the comparative weakness of the muscles concerned in breathing, they run a different course from that of similar affections in grown-up persons, especially when the tubes become further narrowed by swelling of their lining and the accumulation of phlegm. The fact that cases of bronchial catarrh are more common in the autumn, remain at an average during the winter, and increase again in the spring, shows that climatic influences play an important part in their production. The human organism feels atmospheric changes more keenly the greater the contrast between the outdoor air and that of the dwelling. Smoke, dust, exhalations from clothes and from human beings, predispose the respiratory organs to catarrh by preparing a suitable soil for the germs —which exist everywhere in the air—to lodge in and produce unhealthy changes in the lining membrane. And these influences have much more effect when the respiratory organs are already enfeebled: hence the severity of bronchial catarrh in anæmic and rickety children.

Symptoms.

In many cases bronchial catarrh follows an ordinary cold in the head. After a few days the voice becomes a little hoarse and the child begins to cough, and at the same time the breathing is quickened and accompanied by wheezy noises in the chest. The cough is not painful and is loose, but small children rarely bring up any phlegm. The cough and the wheezing increase without very much affecting the child's health, and after a time these symptoms gradually abate, and finally pass off entirely. In other cases, especially in rickety children, the catarrh takes a very chronic course; a tiresome cough, with some difficulty of breathing, may last for weeks or months, getting better and worse, without getting quite well. In other cases, especially in infants, the bronchial catarrh may develop into asthma, or permanent enlargement of the bronchial tubes with ulceration. When the catarrh spreads into the smallest of the bronchial tubes, the disease is called capillary bronchitis, and assumes a much more serious aspect, owing to the severity of the symptoms and the danger of pneumonia. The cough becomes more troublesome and painful. The breathing is very shallow and quick, 40 to 60 to the minute, the pulse rises to 120 or 160, and the temperature to 103° or 104°. The cheeks are flushed, the lips bluish, and at every breath the nostrils dilate, while the pit of the stomach just below the breast-bone sinks in. The child is fretful and restless, he has little appetite, and often there is a slight looseness of the bowels. The progress of the case varies according to the age of the patient, the extent to which the bronchial tubes are affected, and the height of the temperature. The younger the child the more distressing is the difficulty of breathing, even though the disease is not extensive. The more the finest bronchial tubes are affected, the more rapidly will the difficulty of breathing increase ; the face becomes more livid, the breathing more shallow, and sometimes convulsions may precede death. In older children the degree of fever, together with extension of the catarrh, will determine the result. The higher the temperature the more serious will be the symptoms, the reason being that the larger amount of oxygen from the air required by the state of fever cannot be supplied owing to the shallow breathing, and the blood, thus insufficiently aërated, cannot supply enough energy to the muscles concerned in breathing, which therefore get exhausted. In this way bronchitis may be very dangerous even for older children, but if the catarrh does not extend the fever begins to lessen, and at the same time the urgent symptoms are relieved, and the complaint takes a favourable turn.

Slight cases of bronchial catarrh are not dangerous, but if the disease is prolonged there is a fear lest dilatation of the tubes may be set up In severe cases the result depends on the age of the child, the height of the fever, the extent of the disease, and the general health. Bronchitis associated with whooping-cough, measles, scarlatina, kidney disease, anæmia, or rickets is more serious than when it occurs in healthy children.

Treatment.

Good food, cleanliness, fresh air, the avoidance of overheated rooms, and the use of cold sponging, will minimise the tendency to this complaint. Medicines are given with the object of lessening the swelling of the lining of the bronchial tubes and helping the expectoration, such as—

PRESCRIPTION 291

Citrate of potash	1 drachm.
Solution of acetate of ammonia .	3 drachms.
Ipecacuanha wine	1 drachm.
Syrup of tolu	3 drachms.

Water to 1½ ounces.

A teaspoonful every 3 hours.

At the same time the chest should be rubbed with some stimulating liniment, such as camphorated oil, to each ounce of which is added 10 drops of essential oil of mustard, or equal parts of tincture of capsicum and opodeldoc. If the cough is irritable and a sedative is required, bromide of ammonium 15 grains, and tincture of henbane 1 drachm, are the best for young infants, made up into a linctus with 1 ounce of syrup of oranges or syrup of tolu. Dose, one teaspoonful occasionally. Or the pectoral linctus of the Children's Hospital:—

PRESCRIPTION 292

Oxymel of squills	1 drachm.
Compound tincture of camphor . .	½ drachm.
Spirits of nitrous ether . . .	½ drachm.
Water to 1½ ounces.	

A teaspoonful for a child 1 year old.

For older children codeine glycerine jelly is good, or ⅛ grain of codeine in a teaspoonful of syrup of cherry-bark.

The child should be confined to the house, not necessarily to one room, but should not be allowed to roam about at will and play in draughty passages and on staircases. The diet should consist principally of liquids, broth, beef tea, and milky puddings. In more severe cases with fever and catarrh of the smaller tubes, the patient must be confined to his bed, which should be placed in a warm corner and sheltered from draughts by screens, and the room must be maintained at a temperature between 65° and 70° F. Hot applications to the chest afford great relief. Fomentations are better than poultices for young children; in unskilled hands the latter are often made too wet and heavy, and hamper the child's breathing to such an extent as to favour death from suffocation. Fomentations may be prepared by wringing out spongiopiline in hot water, and covering with jaconette. For older children poultices of 1 part mustard to 5 parts linseed meal may be renewed every three hours. If the cough is very tight at first, an emetic of 5 grains of powdered ipecacuanha in a teaspoonful of syrup of oranges should be given to an infant under two years of age, and repeated in ten minutes if necessary; this has the effect of loosening the phlegm and expelling it. After this the medicine containing antimonial wine should be given regularly (Pr. 289). In the prolonged forms of bronchitis seen in feeble and rickety children, cod-liver oil is of great service.

CATARRHAL PNEUMONIA

As this form of inflammation of the lung is often a complication of acute bronchial catarrh, caused by the spreading of the inflammatory process from the bronchial tubes into parts of the lung itself, it may conveniently be described in this connection. In other cases it arises during the course of whooping-cough, measles, diphtheria, etc. It is a different disease from croupous pneumonia, and does not begin so suddenly, or come to an end so decidedly by what is called a crisis, but declines slowly; further, it attacks small portions of the lung, and is prevalent in weakly rather than in robust children, and in girls rather than in boys.

Symptoms.

The disease usually begins with symptoms of bronchial catarrh. After a few days' coughing, fever and rapid and difficult breathing make their appearance. The little patient becomes feeble and rather blue, with an anxious expression. The cough becomes distressing and frequent, and occurs in exhausting paroxysms. The pulse rises to 140 to 180, sometimes even 200, a minute, the breathing to 70 to 80, the temperature to 104° or 105° F. The course of the illness varies according to the extent of the inflammation and the resisting power of the child. In rickety children with narrow and deformed chests, the difficult breathing is apt to increase and become shallower, the cough and blueness may disappear, and the latter gives place to an intense pallor, the limbs become cold, the pulse hardly perceptible, and the little patient passes away. Sometimes life is threatened by the high temperature with delirium and gradual enfeeblement of the senses. When the malady takes a favourable course the fever becomes less, strength is maintained, the cough is loose and less troublesome, and the breathing easier, while the child becomes less apathetic, takes more interest in what is going on around him, and gradually recovers, but in a slow and irregular manner, which is in strong contrast to the rapid recovery which takes place in the other form of pneumonia.

The whole course of the disease is dominated by the character of the breathing, which is directly dependent on the amount of lung affected, and its fatality also depends on the disease with which it is associated. When it comes on, for instance, during whooping-cough or measles, the outlook is very grave. It is, moreover, more dangerous in ill nourished, rickety, and scrofulous infants than in those whose constitution and health are up to the average; but even robust infants may succumb to the disease when it is prolonged and attended with very high fever and relapses.

Treatment.

Treatment must be directed mainly to subduing the fever and maintaining the strength of the patient. When the temperature is high, either tepid sponging, or tepid "packs," or a warm bath gradually cooled down to 60°, may be employed, and such measures are urgently demanded if the temperature reaches 104° or more. At the same time antifebrile remedies may be employed with prudence, such as phenacetin and antipyrin, but these should not be given for long. Attention must be paid to the respiratory organs, and perhaps the safest remedy is the mixture of ipecacuanha wine given under the head of bronchial catarrh (Pr. 291); this is preferable, for feeble children, to aconite and antimony. One of these three drugs should be persevered with as long as the phlegm is scanty and difficult to cough up. In the case of robust children, ½-minim or 1-minim doses of tincture of aconite may be given every four hours to a child between two and four years, or 5 minims of antimonial wine. Later on, with a loose cough and free expectoration and absence of fever, stimulating expectorants may be given, such as:—

PRESCRIPTION 293

Carbonate of ammonia . . .	12 grains.
Syrup of squills	½ ounce.
Spirits of chloroform	12 minims.

Infusion of senega to 1½ ounces.
One teaspoonful to be given every 4 hours.

If suffocation threatens, and the tubes seem choked with phlegm, an emetic may be given, but emetics are not so efficacious as in the early stages of bronchitis. Alum, 30 grains in a teaspoonful of syrup of squills, is less depressing at this stage than ipecacuanha. When there is much blueness and collapse, one to three leeches, placed on the right edge of the breast-bone, are often of the greatest service, bleeding being encouraged by hot applications when they have fallen off. Wine is often needed in the later stages, but should not be given too early, and always with caution, lest it act as a narcotic and thus prevent expectoration. For the same reason, sedatives must not be given when there is an accumulation of phlegm in the bronchial tubes. Of late years belladonna has been extensively used in the treatment of catarrhal pneumonia, ⅙ to ¼ grain of the green extract rubbed up with glycerine in a teaspoonful of chloroform-water every four hours. In conditions of extreme collapse, hypodermic injections of strychnine are to be given.

The digestive organs are very liable to be upset during an attack of catarrhal pneumonia, hence care must be taken not to overload the stomach and produce vomiting and diarrhœa. An occasional dose of calomel or rhubarb should be given, and the digestion carefully attended to, bearing in mind that catarrh of the bowels is not unfrequently the result of an attack of bronchitis or pneumonia. In convalescence a change of air is to be recommended ; its beneficial effects in restoring the child's health are often marvellous, and at the same time preparations of maltine and iron should be given, or nux vomica with dilute nitric acid, as in the following mixture :—

PRESCRIPTION 294

Dilute nitric acid	24 minims.
Tincture of nux vomica	12 minims.
Cherry laurel water	2 drachms.
Syrup of orange	½ ounce.
Chloroform-water to 1½ ounces.	

A teaspoonful 3 times daily after meals for a child 7 years old.

LOBAR PNEUMONIA

This is quite a distinct complaint from the catarrhal affection we have just described. It runs the same course in children as in grown-up persons, commencing with a sudden and marked rise of temperature, which continues with only a slight fall every morning until about the fifth or seventh day, when it usually declines rapidly by what is called a crisis. Instead of affecting the lung in patches, lobar pneumonia involves a whole *lobe* of one or both lungs, and is directly produced by the action of a special germ, the pneumococcus or pneumonia microbe. It is probable that these germs cannot set up pneumonia in a healthy lung ; but if the child catches cold, or his health is in some way affected, a suitable soil for infection is produced. The disease occurs in summer as well as in cold weather, but most cases seem to happen in the month of March. It attacks both sexes equally, and for the most part robust children.

Symptoms.

The illness commences suddenly, with high fever and vomiting, often with convulsions ; the cheeks become flushed, the lips dry, the breathing rapid, and accompanied by a peculiar short grunting noise, which is very characteristic, and by a dry, hacking cough. Young infants lie quiet, as movement of the chest is painful ; and older children often complain of pain, which they refer to the stomach. The temperature rises rapidly to 104° F. or more, breathing to 40 to 60 a minute, and the pulse to 120 to 160. Appetite is lost, the tongue is coated ; in some cases there is diarrhœa, and in others obstinate constipation ; the urine is scanty and high-coloured, and not unfrequently contains albumen. The child remains in this condition—very ill—for about a week, and then, usually between the sixth and ninth days, the temperature runs down in a few hours to normal, and the patient falls into a quiet sleep, with a profusely sweating skin. When he awakes the scene is changed, the breathing has become easy and painless, the temperature is subnormal. Appetite returns, a large quantity of urine is passed, and nothing remains but slight wasting and anæmia. This process is called the crisis.

Complications.

The course of the disease does not, however, always follow these lines. Sometimes pneumonia " aborts "—i.e. comes to an end in about three days. In other cases vomiting and diarrhœa are very marked (gastric pneumonia) ; in yet others there is much headache, delirium, convulsions, or drowsiness (cerebral pneumonia). There are many complications that may occur in pneumonia, such as inflammation of the covering of the heart (pericarditis), inflammation of the mouth and throat, herpes or tetters on the lips, dysentery, inflammation of the ear, brain or kidney, and jaundice. The most important, however, is pleurisy, which is apt to lead to abscess in weakly children.

Most cases of lobar pneumonia, in otherwise healthy children over three years of age, recover. Complications add considerably to the danger, which is greater also when both lungs are attacked. It is easy to recognise lobar pneumonia when the symptoms are marked, but the beginning is something like that of scarlet fever. The cerebral form may be mistaken for meningitis.

Most cases will get well without any treatment beyond rest in bed and nursing. In other cases, life is threatened by the height of the fever, or failure of the circulation. A temperature of 103° F. in a child does not call for any active measures, but sponging with tepid water soothes the little patient and encourages sleep. Tincture of aconite in 1-minim doses may be given every three or four hours. If the temperature reaches 104° or 105° F., a wet pack at 60° or 70° (Vol. II., p. 90) will lower it effectually; in urgent cases with delirium or convulsions the child may be put into a warm bath, and the temperature of the water reduced gradually to 60°. Antipyrin and phenacetin are not to be recommended, as they produce considerable depression; while quinine given in large doses to reduce the temperature often causes dyspepsia. For the same reason the use of aconite must be watched, and if necessary replaced by the saline ipecacuanha mixture (Pr. 291), to each dose of which 2 or 3 drops of tincture of digitalis can be added if there are signs of failure of the circulation. Alcohol, useful in occasional doses when stimulation is necessary, is harmful in the early stages, and when given continuously or as a routine. Where there is great restlessness, or pain from pleuritic complications, ½ to 2 grains of Dover's powder may be given at night.

Treatment.

CONSUMPTION IN CHILDREN

The causes of tubercular disease of the lungs have already been dealt with (Vol. I., p. 296), and nothing more need be said on that subject. The disease occurs in children in three forms: (1) Acute miliary tuberculosis, which commences with obscure symptoms, such as rapid wasting and weakness, quick breathing, for which there seems no adequate cause, irregular rises of temperature, and perhaps slight cough. In some cases the symptoms are not unlike those of typhoid fever. (2) Galloping consumption, which begins with irregular rises of temperature, quick breathing and pulse, an irritable cough, sweating, and great loss of strength. These symptoms go on for a few weeks, the child takes less and less nourishment, and sinks from exhaustion. In some cases meningitis supervenes and puts an end to life, or symptoms of consumption of the bowels make their appearance, such as diarrhœa alternating with constipation, pain and distension of the belly, which increase the fever and exhaustion and hasten the end. (3) Chronic consumption. In children this does not take the characteristic form it takes in grown-up people, except after the second teeth are cut. In young children, wasting is the first thing to attract attention. In a very short time the child becomes "mere skin and

Symptoms.

bone," with a dry, harsh skin. Breathing is quickened; there is usually a rise of temperature during some part of the day. Often there are diarrhœa and loss of appetite and a tiresome cough. The disease runs a quicker course than in adults, the vital force is sooner exhausted, and with progressive wasting, sweating, and diarrhœa life comes to an end. Sometimes the disease is complicated by other tubercular disorders, such as meningitis and peritonitis.

All these forms of consumption in children are extremely fatal, especially to children about the school age, in whom a fatal issue is hastened by the fatigue of learning lessons and school life in general.

Treatment.

All that has been recommended for the management of tubercular disease in general (Vol. I., p. 302; Vol. III., p. 42) is to be applied in the management of cases of consumption—*i.e.* fresh air, a liberal nourishing diet with plenty of milk, and stimulation of the skin by means of cold sponging and rubbing. In acute tuberculosis and galloping consumption, we must endeavour to lessen the fever by means of cold sponging and wet packs, and the use of quinine; the tiresome cough must be calmed by means of sedatives, such as the pectoral linctus prescribed under the head of Bronchial Catarrh (Pr. 292), or 1-drop doses of solution of morphine, carefully watched. In more chronic forms as much time as possible should be passed in the open air, even in winter. The chest may be painted every night with strong tincture of iodine, diluted with twice as much glycerine and water in equal parts. It should be applied to the breast-bone and below the collar-bone, and covered with wool, and left off if the skin becomes sore, to be resumed later on. Or the liniment of iodide of potash and soap may be rubbed in. The most efficacious drug is creasote, but its nauseous taste often prevents its use. Some children will take the creasoted wines that can be procured. Those old enough to swallow pills may take one composed of creasote 1 minim, iodoform ½ grain, three times daily; or palatinoids of beech wood creasote ½ minim, three times daily. Carbonate of guaiacol in 5-grain doses is less objectionable in taste, and does not upset the digestion.

Provided the digestive organs are in good order, and there is some likelihood of them being tolerated, cod-liver oil and preparations of malt and iron should be administered, but must be left off should appetite fail or the tongue become coated. Cod-liver oil acts not only as a food but also as a tonic, and it may be given as an emulsion with lime or maltine. The following is a good formula :—

PRESCRIPTION 295

Cod-liver oil	1½ ounces.
Gum acacia, syrup, glycerine . .	½ ounce of each.
Essence of vanilla and brandy . .	1 drachm of each.
Oil of cinnamon	2 drops.
Distilled water to 6 ounces.	

One to 3 teaspoonfuls for a dose.

Syrup of the hypophosphites is also useful, and may be combined with cod-liver oil. If sweating is excessive, a powder composed of salicylic acid 3 parts, starch 10 parts, talc 87 parts, may be used for the skin.

It is of extreme importance to recognise consumption in its earliest stages, so that by an open-air cure there may be a fair chance of its being arrested. As in children the disease often begins in the bronchial glands and spreads from them to the lungs, it has been proposed to adopt the X-rays as a means of detecting enlargement or hardening in the glands, with a view to sending a child thus affected to a seaside sanatorium, where, under favourable conditions, the disease may undergo a natural cure.

PLEURISY AND ABSCESS IN THE CHEST

Inflammation of the pleura, or covering of the lung, is a complaint of frequent occurrence during childhood, and one that often remains undiscovered. It may occur spontaneously from exposure to cold, but more often comes on during an attack of pneumonia, scarlatina, rheumatism, or tuberculosis. It may make its appearance as a sudden and acute illness with high fever, or as a comparatively mild ailment lasting for many weeks. It may be characterised by a considerable quantity of fluid in the chest (pleurisy with effusion), or there may be an inappreciable quantity of fluid (dry pleurisy).

Symptoms.

In its acute form, it begins with high fever and sometimes convulsions. The child is flushed and has a hot, burning skin, the breathing is short, rapid, and shallow, interrupted by a dry and painful cough. He is restless, and at times a little delirious. The urine is scanty and high-coloured, the bowels are confined, the tongue is coated. Pressure on the chest between the ribs often occasions acute suffering, and the child, if old enough, complains of stabbing pain over the affected part. The further course of the attack varies according to whether there is fluid or not. In the first case the difficulty of breathing increases, and it may be possible to notice that one side of the child's chest hardly moves, whereas the other heaves conspicuously at each breath taken. The fever then begins to abate, and remains for a week or so at a moderate height, rising a little at night. The pulse continues quick, although the urgent symptoms are less marked, while the child gets pale and thin. The complaint thus runs a milder course, until presently the fever ceases while the fluid is becoming absorbed, and at length convalescence is established. This favourable result, however, is not always attained, as it frequently happens that the fluid becomes converted into matter or "pus," with increased difficulty of breathing and more fever, and an "empyema" or abscess in the chest results.

If the pleurisy remains "dry," the stitch in the side continues for a time, or the child complains of pain in the belly; the cough and fever then gradually subside in the course of a few days. It is this form which is often overlooked, since young children are not able to localise attacks of pain, and the special symptoms of pleurisy are hidden, or masked by those of the disease to which it is secondary; and besides this, it often runs a very mild course, with hardly any fever or general disturbance of health. It should be noted that in the early stages, when the affected side is painful, children lie on the back or on the sound side to avoid increasing the pain by pressure; on the other hand, when there is fluid in the chest, they lie on the affected side—which is no longer so painful, but is hampered in breathing—so as to give full play to the expansion of the healthy side of the chest. If in a case of pleurisy with effusion the fluid does not get absorbed easily, a good deal of damage results; the heart, which had been pushed out of place by the fluid, may be bound down and fixed in an undesirable position by what are termed adhesions; or the lung itself may become tied down and prevented from expanding properly, so that the chest wall falls in and the spine becomes curved. Another unfavourable result is that the fluid becomes converted into matter or pus, or perhaps more often has been so from the first, as is especially likely to happen when pleurisy complicates pneumonia occurring during scarlet fever, measles, or whooping-cough. Such a condition should always be suspected when the fluid does not become absorbed within a reasonable time, and when the fever continues high ; but its existence can only be ascertained with certainty by a doctor, who not unfrequently has to puncture the chest with a fine exploring needle for this purpose.

Acute pleurisy, as a rule, however, ends favourably, the child being usually restored to health completely and within a reasonable time when the pleurisy is "dry," or when the quantity of fluid is not excessive. On the other hand, the result is doubtful when pleurisy accompanies scarlet fever or tuberculosis. If the fluid is secreted slowly it is less dangerous, even though it is very abundant, than when it is formed rapidly, as in the latter case serious disturbance of the action of the heart is apt to occur. Empyema in children is not nearly so serious as in grown-up persons ; in fact, where there are no complications a complete cure may be expected by surgical methods. The abscess may dry up if it is not large, but if it is of any size the sinking-in of the chest which results will lead to serious consequences. If the matter remains, the child becomes thin, sallow, and anæmic, with a harsh, dry skin, "clubbing" of the finger-tips, and a good deal of hectic fever. At length the matter finds its way through the ribs, bursts through the skin, and discharges for a long time, or it may open into the lung and be gradually coughed up. Such processes are naturally very slow, and entail a great deal of suffering, notwithstanding that recovery may in this way eventually take place. Sometimes the matter finds its way in other directions, giving rise to abscess in the liver or in the loins, or to peritonitis.

Treatment.

Acute pleurisy requires rest in bed and the administration of remedies to ease the pain and lessen the fever and inflammation. Salicylate of soda 5 to 10 grains, or antipyrin 2 to 6 grains, may be given to children. The former drug is said to possess the property of lessening the amount of fluid formed in the chest. If there is severe pain, one or two leeches will give great relief ; if less severe, hot poultices or fomentations, with or without belladonna. Strapping the chest on the affected side with strips of belladonna plaster has also been recommended. Dover's powder, ½ to 1 grain, may be given as an anodyne to older children, the effects being carefully watched ; to babies, 1 to 3 drops of compound tincture of camphor. Small doses of calomel have been recommended where the fever keeps up and the secretion of fluid shows a tendency to increase (¼ grain for a child one to two years), and painting the chest with tincture of iodine diluted with glycerine. To get rid of the ultimate traces of fluid, syrup of iodide of iron, maltine, good food, and fresh air are the best methods. Should adhesions be left, massage and breathing exercises are indicated.

When the accumulation of fluid takes place very rapidly, so that the breathing is seriously interfered with and the heart pushed a great deal out of place, the time has come for giving relief by puncturing the chest and drawing off the fluid, either by an aspirator or by letting it drain away for two or three hours through a fine tube, called Southey's cannula. In more chronic cases also, where the fluid shows no sign of diminishing after some weeks, in spite of treatment, it should be drawn off. Sometimes the chest fills up again with fluid, and the operation has to be repeated. As soon as the presence of matter in the chest (empyema) is made certain, arrangements should be made to remove it ; in some cases, especially infants and very young children, removal of the pus once or twice by " aspiration " will effect a cure, but the majority of cases require to be dealt with by other surgical methods, such as tapping and draining, or by making an incision and, if necessary, removing part or the whole of a rib.

ASTHMA

This complaint, although it often commences during childhood, does not assume the same importance as in older people. In children it is found at from two months to twelve years of age. Some cases described as asthma do not properly come into this category. For instance, there is dyspeptic asthma, which is associated not with bronchial catarrh but with indigestion, the child having an attack of difficult breathing after taking improper food. Then there is a condition of urgent, spasmodic breathing, due to uræmia—which occurs in scarlet fever when the kidneys are inflamed and also attacks of difficult breathing frequently seen in hysterical children. Some attacks of asthma in children occur in connection with disease of the nose and throat, such as chronic catarrh, adenoids, and enlarged tonsils, but it must not be assumed that they always stand in the relation of effect and cause, the asthma not always being cured when the other condition is remedied.

The attacks begin sometimes in connection with bronchial catarrh, and at other times apart from it ; in the latter case they are unattended with feverishness. The child sits up in bed, drawing in his breath with difficulty and with a loud wheezing noise. His expression is anxious, the lips are blue, the limbs cold, and the pulse is very weak; with open mouth and dilated nostrils he fights for his breath, often seizing hold of the end of his cot or bed to make full use of his muscles in order to get air. After a time the breathing becomes easier and freer. During a few paroxysms of coughing some clean, frothy phlegm is got rid of, sleep often follows, and the child awakes quite lively.

Symptoms.

The number of attacks is variable; sometimes they happen every day, or at other times after an interval of a few days. They gradually diminish and finally cease for a time. Sometimes, as children get older, they grow out of these asthmatic attacks, but more often they lay the foundation for chronic asthma and the affection known as emphysema of the lung (Vol. I., p. 289) in later life.

Treatment.

The nose and throat of every child suffering from asthma should be carefully examined, and treatment directed to any unhealthy conditions. A change of climate is essential: either the seaside or bracing mountain air should be chosen, according to whether relief is obtained from a high or a low altitude. Gymnastic and breathing exercises form an important part of the treatment, and every care should be taken to prevent the child from taking cold and his digestion from being upset, for cold winds and indigestion will often set up an attack. Arsenic and cod-liver oil should be given between the attacks, and during them iodide of potassium 1 to 3 grains, with tincture of lobelia 5 minims, every three hours. Relief is often obtained by burning nitre papers and by inhaling the fumes of pyridine, 5 to 6 drops being poured on to some cotton-wool or lint at the bottom of a tumbler.

HEART DISEASE IN INFANCY

Heart disease in infants and children is not uncommon, and it has been explained (p. 44), when describing rheumatism in childhood, that in children it is a more frequent complication of that disease than in adults, and that it is liable to occur in cases which are otherwise so mild, with so little fever and pain, that they might almost be overlooked or considered unimportant. This applies to inflammation of the heart lining (endocarditis), and is the chief matter of importance in connection with heart disease in childhood, the symptoms and treatment corresponding very closely with those in adult cases. During the first two or three years of life, however, there is but little liability to rheumatism, and yet pericarditis—inflammation of the membrane that envelops the heart—is not uncommon. It is then set up by the spread of inflammation from other organs, especially in pleuro-pneumonia and empyema (p. 143); it occurs often without evident symptoms, and may be overlooked, but in spite of this may leave permanent traces of the injury it has done. The one affection of the circulatory organs which is peculiar to children is that which is present at birth, and is due to faulty development.

At the time of birth many important changes occur in the organs of circulation by which the course of the blood is entirely altered. If those changes fail to occur, the infant is born with congenital heart disease, which is a serious condition, and often makes it impossible to rear the child. This affection is occasionally met with in several members of the same family, and is liable to occur with other malformations.

Symptoms.

The symptoms are those of imperfect circulation, the most marked being a blue dusky condition of the whole body. It is from this appearance that the name the "blue disease," or cyanosis, is derived. The fingers and toes become enlarged at their tips, or clubbed, as it is called, the nails are much curved, and the child is liable to be attacked by sudden difficulty of breathing, and even convulsions, if subjected to any excitement or to exposure to cold. These children are very difficult to rear; they are backward in talking and walking, they are liable to bronchitis, and their digestive organs work badly; it is seldom that they reach adult life.

Malformations of the heart cannot be relieved by treatment, though they may gradually grow less if the child survives and the heart grows sufficiently strong to overcome the difficulties of the circulation. The body must be carefully protected from all exposure to cold; any excitement and exhaustion must be avoided, and the strength must be maintained by an easily digested and nutritious diet.

CHAPTER LII

DISORDERS OF THE SKIN IN CHILDREN

Birth Marks: Nævi and Moles—Eczema—Red Gum—Chafing or Intertrigo.

BIRTH MARKS (NÆVI)

THESE consist of red or purple spots or patches which are due to the formation of blood-vessels in the skin. They are called also "mother's marks," or nævi, and are said to occur in some form or other in about one-third of all children. They are always present at birth, though they may not be noticed until some time later, as they may not be sufficiently conspicuous to attract attention. Their colour usually disappears on firm pressure with the finger, and the simplest forms are not raised above the surface of the skin. In size they may be anything from pin's head to large patches as big as the palm of the hand, to which the term "port-wine stains" is applied. A very common size is that of a threepenny-bit. Any part of the body may be affected, but the port-wine stain has a special tendency to disfigure the face.

Cause.

Apart from the fact that they are formed of enlarged blood-vessels, nothing is known of their cause, although the common belief that many of them are produced, and their situations determined, by strong impressions of the mother before birth is supported by many instances, and can be considered to be true in, at any rate, a few examples. The notion is that the mother had a great longing during her pregnancy for a lobster, strawberry, raspberry, or some other red-coloured article of food, and that the influence of her mind has impressed upon the child an image of the thing she longed for; hence the term "mother's marks."

The great majority of the slighter marks disappear spontaneously in the course of the first month of life; some disappear after an illness—especially whooping-cough; others remain stationary; but a few increase rapidly in size. In any case, unless quite small, they are decidedly disfiguring, and if situated on the face or neck will require removal for appearance' sake. If, however, they affect a part that does not show, and are not increasing in size, it is far better to leave them alone.

Many forms of treatment may be adopted, depending upon their nature and their situation. Those affecting the face, if small, can often

Treatment.

be destroyed by pricking them at many points with a hot needle; those of a larger size, with a needle heated by electricity. Caustics are sometimes used, or the spot may be chosen for the performance of vaccination. In all these methods scars are left, and it is a matter for consideration whether a white scar will be less ugly than the coloured spot. For the largest nævi the best plan is to tie the vessels passing to them, or cut out the growth bodily; but this involves the use of an anæsthetic.

MOLES

These are birth-marks formed by local collections of dark patches of pigment in the skin, which occasionally become much thickened and roughened, and are often the seat of an excessive formation of firm dark hairs. They are most commonly met with on the face, neck and back, and their colour varies from a light brownish-yellow to black. The cause of them is unknown, and they are not of any importance, and require no treatment unless for the sake of appearance. They should not be removed by caustics, but by electricity or the knife.

ECZEMA

Eczema is a common disease of childhood, and shows itself more frequently during the first five years than at any other period of life. The skin of an infant is very delicate, and the various forms of irritation to which it is so much exposed—such as the contact with napkins soiled with urine and motions, and the friction of frequent washing—are very liable to set up an eczematous inflammation. This disease is also very liable to relapse after apparent cure, and may continue to give trouble on and off for years.

Causes.

Eczema is predisposed to by anything that injures the child's general health. After an attack of indigestion or diarrhœa, an irritation—which in health would cause no trouble—may set up a severe attack of eczema. There is close association between the skin and the digestive organs, and many a time an attack of this complaint can be directly traced to some unsuitable food or to too much food. Teething is also looked upon as a cause of eczema, and, although its influence is certainly much exaggerated, there is little doubt that occasionally it may act in this way. Vaccination, too, is sometimes followed by a general eruption, but its connection with eczema is not very evident, and probably the sequence of events is only accidental. An eczema spreading from the spots is, however, sometimes met with.

In infants and young children the favourite seats of eczema are the head, face, and behind the ears, and it is liable to form large crusts which mat the hair together and set up great irritation. As a result of this, the lymphatic glands in the neck often become enlarged and swollen, and if treatment is not at once employed, these may soften and form very troublesome abscesses. Probably the head is most frequently attacked because of the active growth and free blood supply to this part, and also in some cases on account of its exposure to cold winds and salt sea breezes.

Treatment.

There is no foundation for the popular belief that the healing of infantile eczema is followed by serious consequences. The sooner it is cured the better for the child. The only exception, which may possibly have given rise to the belief, is that of a freely discharging eruption which covers a large surface of the body in fat, full-blooded, over-fed infants, in which cases soothing mild treatment should first be employed, with limited, rather spare diet and free purges. In all cases the food must receive attention. With breast-fed babies the mother should be very careful about what she eats and drinks. She must abstain from all stimulating foods and drinks, such as beer, tea, coffee, salt meats or greasy dishes ; and if she is out of health she must take plenty of simple food—fish, chicken, fresh meat, vegetables and milk. The mother's milk must be nutritious, but may sometimes be too rich or be taken in too large a quantity. With children on the bottle it is necessary to examine the motions to see if the food is being digested, and, if lumps of milk curd are being passed, to change the diet to one of the infant foods. Older children must not be allowed much sugary or starchy food, but may take eggs, cream, meat broth, tender minced meat, vegetables (green), and milk to drink. In many cases internal remedies are unnecessary, but the bowels must be carefully regulated, 1 grain of grey powder twice a week being suitable for a baby of one year, and some Hunyadi water or Carlsbad salts for older children. If the child is anæmic and "strumous"-looking, cod-liver oil and the syrup of the iodide of iron are indicated. Arsenic should never be given with acute eczema, but is occasionally necessary in obstinate cases with a dry, scurfy eruption, and the following medicine would then be suitable :—

PRESCRIPTION 296

Fowler's solution	12 drops.
Steel wine	3 drachms.
Syrup	3 drachms.

Water to 1½ ounces.

A teaspoonful to be given 3 times a day after food, to a child of 12 months.

The skin when affected with this complaint should never be washed ; it is better to leave it uncleaned or to dab it over with a piece of cotton-wool soaked in olive oil or warm milk-and-water. An ointment or lotion should then be applied, care being taken that it is kept in close contact with the skin by the pressure of a light bandage. In the early stage a calamine lotion (Pr. 297) or soothing zinc cream (Pr. 298) will be suitable, and in the later a zinc and tar ointment (Pr. 299).

PRESCRIPTION 297

Calamine powder	2 drachms.
Hazeline	3 drachms.
Boric acid	½ drachm.

Make a lotion.

PRESCRIPTION 298

Oleate of zinc	3 drachms.
Lanoline	1 drachm.
Olive oil	½ ounce.
Lime-water	½ ounce.

Make a cream.

PRESCRIPTION 299

Oxide of zinc	1 drachm.
Tar ointment	2 drachms.
Rose-water ointment	2 drachms.
Lanoline	4 drachms.

Make an ointment.

RED GUM

Causes.

This also is a common affection of childhood, and appears during the first few months of life. It consists of small red pimples, which are scattered over the body and cause intense itching. It occurs at the time of life when the little patient is passing through the troubles of vaccination and teething, and both of these conditions have been considered to be exciting causes. Free perspiration, produced by too warm clothing, is also occasionally a cause. But the majority of cases can be traced to some disorder of the digestive organs due to unsuitable food, and the connection with it of teething can thus be explained. Its course is indefinite, and it may continue, on and off, for years.

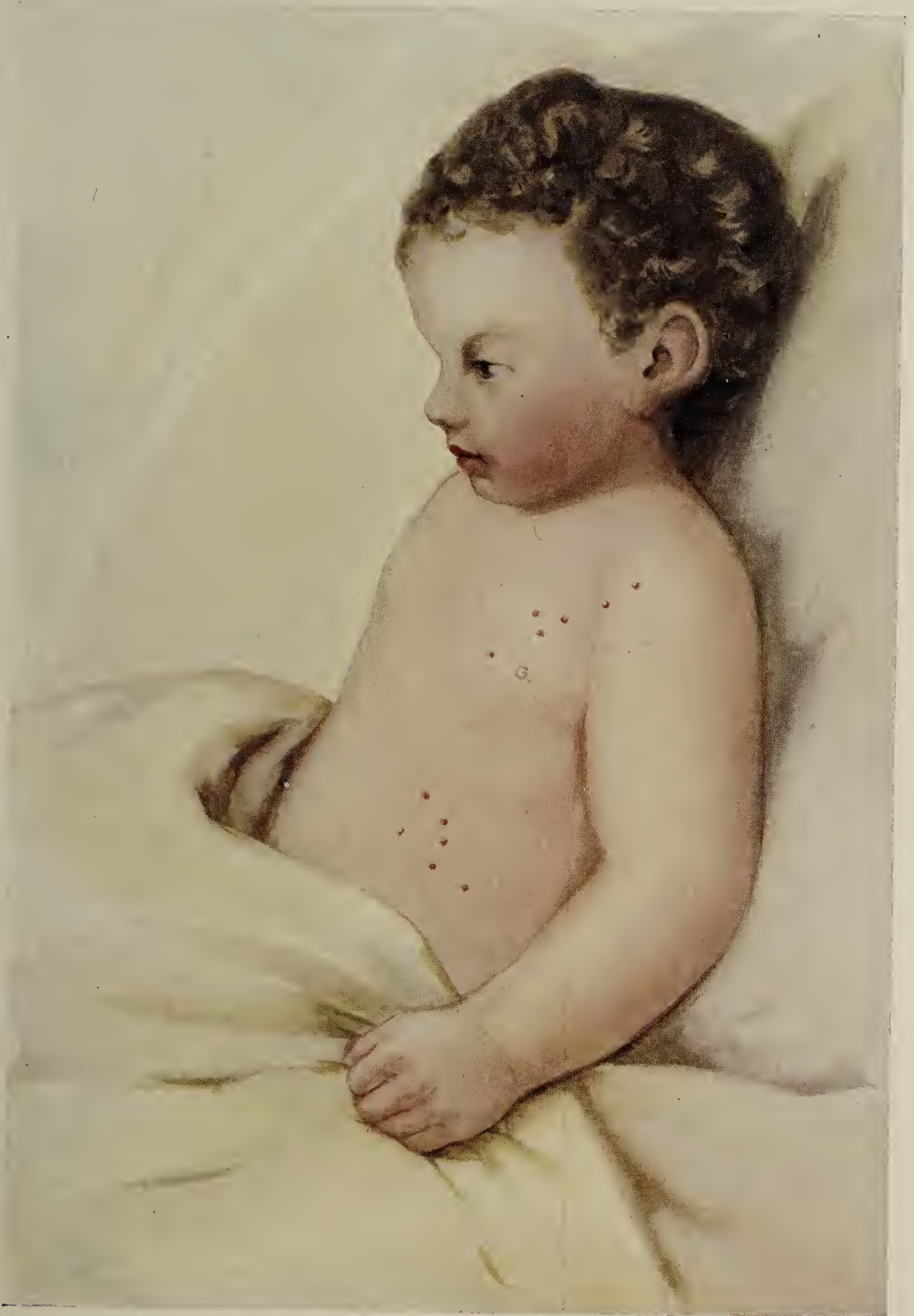
Treatment.

The aim of treatment is to remove the cause, whether it be unsuitable food, indigestion, constipation, worms, want of cleanliness, or irritating clothing. The patient must be suitably clad, must have plenty of fresh air and a daily bath, and the diet must be regulated. Soothing lotions, such as lead lotion, or some simple powder should be used to allay the irritation, and a few doses of chalk mixture may be given to remove acidity, with an occasional mild aperient.

CHAFING OR INTERTRIGO

Chafing is not uncommon about the neck, but its most usual situation is in the groins, thighs, and genital organs—that is, the parts covered by the diaper. The soiling and soaking of the skin with urine and fæces produce it rapidly, and the greatest care is necessary to keep the skin of these parts scrupulously clean, and to change the diapers frequently. A daily bath should be given to every child who is healthy, but he should not be allowed to remain in it too long, or the skin will become soft and easily excoriated. A simple unirritating soap should be used and soft water. After washing, the skin should be carefully dried without much friction, and powdered over with good fuller's earth, cimolite powder, or equal parts of oxide of zinc and starch. If the skin grows red, hot, and tender, greater care is required. The surfaces must be kept apart by placing a thin layer of linen or cotton-wool between them, and the digestive organs must receive attention, for if dyspepsia or diarrhœa occurs the motions will irritate and inflame the skin until it becomes sore and discharges. A simple ointment will then be more suitable—boracic acid or zinc—as by greasing the skin it prevents it from becoming softened and soaked with moisture.

There are many other skin complaints of common occurrence in childhood—impetigo contagiosum, which affects chiefly the face (Vol. II., p. 19); ringworm of the head (Vol. II., p. 29), scarcely met with except in children; lupus (Vol. II., p. 24), which usually begins at an early age; and eruptions due to syphilis, which are described with that disease (Vol. III., p. 35).



RED GUM ERUPTION.

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PART III

DOMESTIC SURGERY

CHAPTER LIII

LOCAL SURGICAL DISORDERS

Corns—Warts—Horns—Chilblains—Frost-bite — Whitlow—Ingrowing Toe-nail—Wens — Abscesses — Boils — Carbuncle — Anthrax —Bunions—Housemaid's Knee—Ganglion—Teno-synovitis.

CORNS

Corns are produced by the pressure and friction of tight or ill-fitting boots, which irritate the horny layer of the skin to excessive growth. They may appear on the hands, also, from friction in sewing or playing the harp. There are two varieties : the hard and the soft. Hard corns usually form on some prominent part of the toes. When the somewhat common deformity of doubling under of the toes produced by short boots exists, they form on the flat ends of the toes which press on the ground, or on the prominent joints which project upwards. The common pearly yellow hue of corns is due to simple condensation of the superficial layers of the skin, and the bluish black tint sometimes seen in the centre is due to bleeding, as the result of injury or attempts to cut them out.

Soft corns are quite different in appearance ; they are soft, spongy, and spread out, far more tender and full of blood. They are generally formed between the toes, most frequently on one or other side of the fourth toe—the one next to the little toe. They are encouraged by the warmth and moisture of this situation.

Corns are sometimes excessively painful, and are much affected by the weather, giving more trouble when it is warm and moist, especially during the springtime. They sometimes, as the result of injury, become acutely inflamed ; they grow red and swollen, have an intense throbbing pain, and a few drops of matter may form beneath them. In order to ease the pain of corns unnatural attitudes are assumed, which may lead in young people to curvature of the spine and muscular mischief in the legs.

Treatment.

To cure corns the utmost cleanliness is necessary. The feet should be thoroughly washed daily with warm water and soap, and dried carefully. Loose, ill-fitting, and patent-leather boots must be discarded. Boots may be made of "pannus corium" or other soft material, and the same pair should not be worn for many days in succession. To relieve the corns from pressure, ring-shaped corn plasters should be worn so that the "eye" of the corn is within the central hole. A drop or two of glacial acetic acid, applied every night with a brush, will make hard corns crumble away. An excellent application is—

PRESCRIPTION 300

Salicylic acid	½ drachm.
Extract of Indian hemp . . .	5 grains.
Collodion to ½ ounce.	

It should be painted on night and morning and allowed to dry; half a dozen applications will soften the corn and make it easy to remove by cutting when soaked in hot water.

Soft corns are to be cured by frequent ablutions, careful drying of the parts, and the free dusting of oxide of zinc powder between the toes. A small portion of dry absorbent cotton-wool should be worn continuously between the toes to keep them from pressing against one another. Glacial acetic acid is also useful.

An inflamed corn should be treated with a small compress of boracic lint, moistened with warm water and covered with oil silk. The doubling up of the toes requires a small splint along the sole, and straps of plaster to retain the parts in a natural position.

WARTS

Warts are outgrowths from the skin, formed by enlarged papillæ and covered with thickened epidermis. The causes in most cases cannot be explained, but in some they are undoubtedly set up by the local irritation of pressure or of poisonous substances. They are most common on the hands and fingers, especially in children, but may occur anywhere. A special form occurs under the nails, another on the female scalp; the latter may give rise to great pain and inconvenience in brushing or combing the hair. Sometimes warts show a distinct hereditary tendency; they may also occur suddenly in crops and disappear in the most unaccountable manner, and for this reason many popular charms and remedies are supposed to be capable of curing them. There is much to support the common belief that some warts are contagious, and that blood drawn from them will cause the formation of others if applied to the skin. A wart may remain stationary for many years, and then by some accidental irritation be started to rapid growth.

Glacial acetic acid, applied with a brush, is a good method of treatment. The skin around should be protected by oil or vaseline. The solution of salicylic acid in collodion recommended for corns (Pr. 300) is also effectual. Those warts that have distinct stalks can be snipped off with a pair of sharp clean scissors, if their base has been previously firmly tied with a fine silk ligature.

HORNS

Hard outgrowths from the skin sometimes form, which are very similar in structure to warts. They are most common on the head and on the toe nails. In the latter case the horn seems to be a deformed and perverted nail; in the former to be developed from a wart or from a wen (sebaceous cyst). The big toe is a specially favourite site. Horns must be removed with a sharp knife or a file, or they may be made to crumble away gradually by constant applications of glacial acetic acid.

CHILBLAINS

Chilblains are due to localised inflammation caused by cold. They occur on the hands, feet, ears, and occasionally the nose—that is, the parts most liable to be affected by changes in the external temperature. Some persons are more prone to have them in one part, other persons in another, and the same part is usually attacked every winter. The liability to chilblains runs in families, children being particularly affected, and women more than men; but it is a common thing for the tendency to be outgrown as age advances.

Causes.

Feebleness or slowness of the circulation is a strong predisposing cause, for those who suffer from cold hands and feet, blueness of the lips and finger-tips, are very special sufferers from this affection. Sudden changes of temperature are particularly injurious; a sudden thaw after frost or snow, an east wind, or change of residence to a colder climate, brings on many an attack. There is no doubt also of the injurious effect of warming the hands before the fire when thoroughly chilled by exposure to cold.

Symptoms.

In the first stage of a chilblain the part is white and cold ; in the second, red, hot, and swollen. At one time there is intense itching ; at another extreme tenderness to the slightest touch. In some persons the chilblains "break" and form superficial moist sores, or the skin may become dead and may separate, as in frost-bite. These various tendencies affect people to a very different extent, and it is not at all uncommon to meet those whose chilblains always break when they have once developed. A peculiar characteristic of chilblains is that they become much worse at certain times, say after meals—lunch or dinner, as the case may be—or when warm in bed, and the attack of increased suffering occurs daily at about the same hour.

Prevention.

The precautionary measures required are many. The health must be maintained by plenty of nutritious food and active exercise. The clothing should be warm, and changes of temperature in the house should be avoided by having a fire in the bedroom. Any local condition that can hinder free circulation through the extremities must be removed. Tight gloves should be changed for loose woollen ones ; elastic bracelets and garters, tight boots, sitting long in cold rooms with the feet hanging down, are injurious, and must be avoided. Stimulating applications should be used to unbroken chilblains, which may be rubbed with camphorated spirit or friars' balsam, painted with tincture of iodine or wrapped round with lint soaked in the following :—

PRESCRIPTION 301

Chloroform	2 drachms.
Belladonna liniment	½ ounce.
Compound tincture of benzoin . .	2 drachms.
Soap liniment	3 ounces.

It is of great importance thoroughly to dry the parts after washing, and to avoid going too near a fire. For broken chilblains nothing is better than boracic ointment.

FROST-BITE

The prolonged exposure of a part to extreme degrees of cold may cause actual death of the structures, but such a result is not often met with in this country. A frost-bitten part—which is usually some portion of the body far from the heart and uncovered, such as the fingers, toes, ears, or nose—first becomes blue and swollen, with a sensation of painful tingling; then white, numb, and insensitive, and finally livid, black, and dead.

To restore the circulation in the early stages requires cautious management, for even when the part appears quite lifeless recovery may often occur provided the temperature be raised very gradually. Rapid warming leads to a rush of blood, which sets up inflammation, and in consequence great destruction and local gangrene. The affected person should avoid the very natural propensity to take hot drinks and alcoholic stimulants, for they stir up the circulation. He should not enter a warm room or go near a fire. He should rub the part in a cold room, preferably with snow, then with water at the ordinary temperature, and finally, as the circulation in it becomes re-established, he should wrap it up in cotton-wool or flannel, carefully avoiding the application of heat. As the frost-bite passes off the part grows red, hot, and painful, and should then be raised to facilitate the flow of blood out of it. Finally, if inflammation occurs in spite of treatment, it should be relieved by warm sedative compresses of boracic lint, sprinkled with tincture of belladonna or opium, and covered with oil-silk.

WHITLOW

Whitlow (paronychia) is an inflammatory affection of the fingers, in which matter forms. It is usually caused by the introduction of some poison or dirt through the prick of a pin or thorn, or at the seat of a hang-nail. It produces much throbbing pain and swelling in the part until the matter can escape. If the discharge forms superficially, it soon reaches the surface, and does but little harm, though if it develops under the nail it may take many days in doing so. Other cases in which the inflammation involves the tendons, or even the bone, are very serious. The whitlow may then destroy the terminal bone of the finger, which has to be removed, or may track up the hand and arm, causing much destruction, and even leading to blood-poisoning and death. The milder forms of whitlow require hot boracic compresses, long soaking of the parts in hot water or linseed poultices, which hasten the formation and discharge of the matter, and may be aided with a timely prick of a clean knife. The intense throbbing pain is relieved by keeping the hand raised to the opposite shoulder in a sling. The more severe varieties require surgical assistance.

INGROWING TOE-NAIL

As the result of wearing ill-fitting or very pointed boots, the flesh may be forced over the nail, which then grows into the flesh, causing a very troublesome sore. The trouble is more liable to occur if the toe-nail is cut away too deeply at the angles. The condition is almost invariably met with on the outer side of the nail of the big toe, and the pressure of the boot causes great pain and inconvenience in walking. To avoid this, comfortable roomy boots should be worn, with broad toes, and the nails should be cut square and the sides not pared or curved. If the trouble is of recent origin, and is not severe, it may be cured by twice a day packing a small piece of oiled cotton-wool between the nail and the overhanging flesh with a probe or the edge of a clean penknife. The quantity of wool used should be gradually increased until the edge of the nail is uncovered, and it should then be inserted under it until the nail has grown forward and the parts are healthy. Another method is to cut a notch in the centre of the top of the nail. If the parts are inflamed and very painful, a boracic acid compress should be applied. These methods proving ineffectual, the only cure consists in having the whole nail removed under laughing gas, and treating the raw surface carefully as the new nail forms.

WENS

Wens, or sebaceous cysts, are swellings formed by a collection of the secretion in the sebaceous glands of the skin, owing to the natural orifice becoming stopped up. They may occur in any part of the skin where sebaceous glands exist, but their favourite site is the scalp. They are commonest in adults and sometimes form in large numbers. As a rule, they gradually increase in size, but never become very large ; they are, however, as the result of injury, liable to inflame, and they discharge, causing a rather intractable wound. This complication should be avoided by applying treatment as early as possible. When quite small it is sometimes possible to squeeze out the contents by firm pressure. If this is unsuccessful, the little depression which can often be discovered on them, and which forms the opening of the duct, may be enlarged by the introduction of a probe, and the contents may then be squeezed out.

If the swelling is but small this may cure it, but in larger ones it is more probable that the thick, cheesy secretion will again collect.

A sebaceous cyst may be easily removed by an operation, which is not dangerous if antiseptics are properly employed. It can generally be performed without the use of chloroform, for the part can be rendered insensitive by the injection of cocaine, or some other local anæsthetic, under the skin.

ABSCESS

As has already been explained when discussing inflammation (Vol. II., p. 82), this process may proceed to the formation of matter (suppuration). If this collect in any quantity it is called an abscess, and any part of the body may be thus involved. An abscess may form quietly and slowly, without any severe symptoms such as pain or heat, and it is then spoken of as a cold or chronic abscess, but if it forms in the course of a few days with much local disturbance it is called acute. When once formed few abscesses get well without discharging their contents, though occasionally exceptions occur when the matter dries up, its fluid part being absorbed and only a dry, cheesy material left, which gives no further trouble, although it is always a source of danger, and may light up an attack of inflammation.

The usual course is for the skin to become bluish and thinned, and more prominent at one particular spot where the matter is said to "point." Here the skin peels, a small hole forms, and the abscess breaks, discharging its contents. The hole grows larger and forms a ragged aperture, surrounded by thinned and unhealthy skin, which becomes puckered in and leaves a very unsightly scar. This can be avoided by a timely incision with a sharp knife before the skin has become thinned and destroyed. Usually, if an abscess cannot discharge, or is not opened by a surgeon, it tends to diffuse itself, and may, in this case, spread in the line of least resistance to distant parts. Thus an abscess caused by diseased bone in the back may burst in the groin, and is called a psoas abscess, after the muscle of that name.

Treatment.

When there are symptoms of an abscess forming—redness, heat, pain, and swelling—the part should be rested, moist heat applied by poultices, and fomentations and an aperient administered. As soon as possible the matter should be let out by lancing, for the suffering is thus cut short, and the amount of destruction to surrounding structures limited. When once the abscess has burst or been opened it soon heals, the cavity collapses and fills up, and the discharge gradually ceases ; but occasionally a narrow track remains, called a sinus or fistula, which requires surgical assistance to heal.

Chronic abscesses denote some fault in the general health, a general debility, tubercular tendency, or other constitutional condition which requires attention before complete recovery can be expected.

Abscesses in different parts of the body have been described elsewhere, abscess of the tonsil with tonsillitis (Vol. I., p. 242), of the liver (Vol. II., p. 193), of the spine with spinal disease (Chap. LIV), of the chest with pneumonia (Vol. I., pp. 282-84), of the ear (Vol. II., pp. 70, 76,) and under the nail with whitlow (Vol. III., p. 161).

BOILS

A boil or furunculus is a local inflammation of the skin, and may occur on any part of the body, but especially on those spots subjected to rubbing or pressure. The common sites are the back of the neck from the chafing of the collar, and the shoulder blades from the friction of the braces. Boils may occur at any age ; they are rare in young children, but common in young adults. In most cases there is some distinct fault in the state of the blood and the general health. Plethoric, over-fed, and debilitated anæmic persons are equally liable to attack.

Causes.

A change of diet from spare to plentiful, as in a servant girl who goes from a poor home to a comfortable situation ; a change of residence, as from the country to London ; a change of habits, as from a sedentary to an active life, or a course of sea bathing, may all be followed by a plentiful crop of boils. The direct cause of the trouble is a germ.

Symptoms.

The ordinary boil appears as a hard lump beneath the skin, which grows gradually hot, throbbing, and tender, and the skin covering it is purplish red and somewhat conical. The inflammation usually proceeds to the formation of matter, which at last bursts through the skin and is followed by a lump of destroyed tissue, called a core. The hollow left soon heals, leaving a depressed and discoloured scar. In what is called a " blind boil " matter never forms ; it gradually enlarges with severe pain, and a sensation of pulsation, but at a certain stage, perhaps as the result of treatment, begins to subside and gradually disappears. It is believed by many that boils rid the blood of certain impurities, and the great surgeon, Mr. Erichsen, says: "In many cases they must be looked upon as salutary, as being the means adopted by Nature to rid the patient of morbid matters that irritate the constitution, and which, if retained, produce disease in it. Hence, after an outbreak of boils, the health often gradually improves."

Treatment.

In the early stage, tincture of iodine painted over the swelling may check its development. Later frequent boracic acid fomentations or a compress of perchloride of mercury, 1 in 2,000 of warm water, or carbolic acid, 1 in 80, relieve the inflammation and pain. Great care should be taken to avoid contamination of the skin with the discharge, lest fresh boils should form in the surrounding area. Linseed poultices are for this reason an unsuitable application. Many days of suffering may be saved by a timely incision with the surgeon's knife, and the evacuation of matter and core. The constitutional treatment must vary according to the patient's condition, and the diet either improved or limited, as may seem necessary. A healthy out-of-doors life, with free action of the bowels, is, however, always advisable. A teaspoonful of fresh brewer's yeast three times daily just before meals may be tried for a week or ten days. Sulphide of calcium is useful to hasten the ripening of boils and prevent the formation of fresh ones; a pill containing $\frac{1}{10}$ grain may be taken every hour, or $\frac{1}{4}$ grain three or four times a day after food. The latest treatment is by the injection of dead germs, but this requires a skilled hand. Finally, the health must be improved by tonics—a teaspoonful of Easton's syrup or of the compound syrup of the hypophosphites three times a day after meals.

CARBUNCLE

A carbuncle is similar to, but more severe than, a boil. It chiefly affects men who are gouty, alcoholic, or diabetic, and chooses for preference the nape of the neck and back. It is deeper seated than a boil, is usually single and not in crops, breaks through the skin in a number of small openings, may spread over a large surface, causes much more pain, fever, and general disturbance of health, and is more dangerous, It is predisposed to by the unhealthy conditions of blood just referred to, and requires for its relief both local and general measures, very similar to those recommended for boils. Hot and frequently applied boracic acid compresses, yeast poultices, or antiseptic (carbolic acid or perchloride of mercury) lotions are necessary. The illness is shortened by making free incisions under the influence of an anæsthetic, and scraping out all the diseased tissue. The strength must be maintained by plenty of nourishing food and stimulants—port wine, burgundy, stout, or spirits—the bowels must be kept freely open, and strong tonics must be given, such as bark and ammonia, quinine and iron, or quinine and nitrohydrochloric acid.

ANTHRAX

In its external form anthrax appears as a disease of the skin with severe constitutional disturbance ; in its internal form no local skin affection is present. The former is also called "malignant pustule," the latter "wool-sorter's disease." The symptoms are produced by the entrance into the body of a germ called the "bacillus anthracis," which is transmitted to man from animals. It occurs in those (1) who come in contact with living animals, and in those (2) who handle products —wool, hair, etc.—obtained from their carcasses. In the external disease the spot of inoculation first shows as a red pimple, with surrounding thickening ; later the skin becomes black, dry, and dead. The swelling spreads rapidly to the surrounding parts and involves the glands, but there is a strange absence of pain, and the discharge is not mattery until at a late stage. Serious general symptoms of blood poisoning set in after a few days.

"Wool-sorter's disease," the internal variety of anthrax, is not accompanied by very alarming symptoms, and yet is a very fatal malady, death occurring in three or four days from collapse of the vital powers. The external form of the disease allows more time for treatment, which in many cases is successful in warding off a fatal issue. It consists in freely cutting out the local disease and swabbing the wound with pure carbolic acid, or dusting it with powdered ipecacuanha, which is also given internally in 10-grain doses. A serum has been prepared which is very efficacious, and may make the other methods quite unnecessary.

BUNIONS

A bunion is a swelling on the foot produced by misshapen boots, which are too pointed or too short. Patent leather, by preventing evaporation from the foot, is also a cause. The trouble is in some cases hereditary. Its most usual situation is at the base of the big or the little toe. The toes, instead of being straight and spread out, are pressed together towards the centre line of the foot, and the base of the bones is made to project at the side, forming a decided lump, which is constantly pressed upon by the boot. The projecting bone is covered with a water cushion or bursa, which enlarges and sometimes inflames, causing acute pain. Matter may form in it and discharge ; this may end in a cure, or it may set up a discharging sore very difficult to heal.

Treatment. The pain of a bunion may be relieved by wearing a boracic acid poultice at night, and a loose soft boot in the day, with a wide sole and square toe. The swelling should be protected from pressure by a circular pad with a central hole. It may be lessened by painting it occasionally with liniment of iodine, or applying an ointment of biniodide of mercury, 10 grains to an ounce of lard. A bunion that has inflamed should have a compress or poultice placed over it, and one that has burst requires that a surgeon should lay it freely open with a knife. In many cases of extreme deformity of the joint, the only method that can bring about a cure is an operation by which the projecting bone is removed, and the joint, which is often affected by a condition like chronic rheumatism, may also have to be excised.

HOUSEMAID'S KNEE

From constant kneeling on hard surfaces—especially cold, damp stone—the bursa or water cushion between the knee-cap and the skin is liable to become inflamed, and "housemaid's knee" is thus formed. A similar condition, called "miner's elbow," is also met with in those who work long resting on the elbow. If the inflammation is chronic, the bursa becomes thickened and hard ; if it is acute, matter may form in it, and finally discharge. In the latter case much pain, swelling, and fever result, and there is danger of the inflammation spreading to the knee, which is a very serious matter. Inflammation of the bursa can be distinguished from that of the knee joint by the swelling being near the surface and in front of the knee-cap, whilst swelling of the joint is at the sides and behind this bone, which is pushed forward.

Housemaid's knee may be prevented by using a cushion to kneel on instead of the bare floor. If it forms, the limb must be rested and the swelling poulticed or fomented. In the chronic form, painting with iodine, or blistering, and avoidance of pressure, will usually bring about a cure, but when there is great thickening, with but little fluid, it is often impossible to remove it by anything short of an operation, by which the whole bursa is taken away. This is usually necessary when frequent attacks of inflammation have occurred.

GANGLION

The name ganglion is applied to a firm, hard swelling, like a marble, under the skin, which may be met with in many parts of the body in connection with the joints and muscle tendons, but most commonly at the back and front of the wrist. Ganglions occur chiefly in people whose occupations lead them to make sudden and violent exertions of an irregular kind, such as wringing clothes. There is not usually any pain in the lump, but the wrist joint feels weak and incapable of any sustained exertion. Sometimes these swellings can be removed by continued firm pressure with the fingers, and it used to be a common but inadvisable practice to disperse them with a sharp blow with a book. A firm wristband is sometimes beneficial, or the joint may be rested and the swelling painted occasionally with iodine, or even blistered. In many cases these lumps return repeatedly upon exertion, and the only means of permanently curing them is to open them with a knife and turn out the contents, but this has to be done with antiseptic precautions, for much harm may follow if matter forms in the wound. Inflammation in a ganglion is relieved by rest and compresses, and, if matter forms, by a free incision.

TENO-SYNOVITIS

As the result of continued over-use or violent exertion, an inflammatory condition is sometimes set up in the sheaths of the tendons or leaders about the wrist and ankle joints, the most common situation being at the back of the wrist. The wrist feels stiff and weak, and pain is caused whenever it is moved. If the hand be placed on the painful part while the joint is moved, a curious sensation of crackling or creaking is felt, caused by the tendons moving in their roughened sheaths. Such a condition requires rest, hot fomentations, and belladonna liniment. When the pain is better, massage and passive movements are beneficial, but active movements must be postponed until all pain has disappeared. A firm wristlet may be worn with advantage for some time to support the arm and prevent recurrence of the injury.

CHAPTER LIV

DEFORMITIES

Club-foot—Flat-foot—Wry Neck—Knock-knees—Bow Legs—Extra Parts—Contracted Hand—Lateral Curvature of the Spine—Angular Curvature—Spina Bifida.

CLUB-FOOT

SEVERAL varieties of this deformity exist. For instance, the whole foot may be twisted inwards (called varus), so that the patient rests on the outer edge of the foot, the sole pointing inwards and upwards ; or it may be twisted outwards (valgus), so that he rests on the inside of his foot and inner ankle ; or the heel may be drawn up and cannot be brought to the ground, so that the patient walks on his toes (called equinus, from its resemblance to the configuration of a horse's foot) ; or the toes are raised and the heel is lowered, so that he walks on the back of his heel (calcaneus). A combination of two or more of these forms is often found ; indeed, the most common is that in which the heel is drawn up, while the foot is twisted inwards (equino-varus).

Causes.

These conditions are caused by some unnatural contraction of a muscle or sinew, either occurring before birth (congenital) or coming on later. The direct cause of the congenital cases is not very clear ; but Messrs. Parker and Shattock, who have made a special study of the subject, have advanced the opinion that many cases can be explained by excessive mechanical pressure and faulty position of the child in the womb before birth, so that the limbs are squeezed together in an unnatural manner. When this cause begins to act early and continues throughout the child's life in the womb, the resulting deformity will be very severe ; whereas when it commences to act at a later period, or lasts for a short time only, the deformity will be less marked. Others believe the condition arises from disordered nerve function acting on the muscles which draw the foot into its deformed position. When occurring after birth, club-foot is due to infantile paralysis, to spasmodic contraction of muscles, or to rupture of a tendon or muscle.

Treatment.

In deciding whether treatment should be carried out by means of apparatus or by a cutting operation, it is important clearly to understand that it should be commenced a few days after birth. At this age more can be done in a short time than in a much longer time in an older child, and it must be borne in mind that a child is never too young for treatment. Besides this, operation is rarely, if ever, necessary if the child is placed under treatment within the first few weeks of life, but later on it undoubtedly shortens the time required for cure of the deformity, and is sometimes desirable, yet in many cases where the child can be thoroughly well looked after and the splints applied carefully and regularly, it may be dispensed with in cases under two years of age. The most effective splints are those made of tin and invented by Dr. Little. In an ordinary case of club-foot (equino-varus) a strip of block-tin, reaching from the knee to the toes, is bent to fit the foot on its outer side and bandaged in this position. Every few days the splint is bent outwards, until by a system of re-bandaging and bending the splint the twist of the foot is corrected. The splint is then applied to the front of the leg and the drawn-up heel corrected in the same gradual manner. A more elaborate splint with a loop of thick indiarubber on the outer side—called Barwell's artificial muscle—is then to be worn until cure is complete, the patient being carefully watched so as to prevent a relapse. Manipulation in such a way as to correct the deformity should be practised every day when the splints are removed, and extreme care must be taken to prevent the skin from being injured by rucks in the plaster or bandages with which the splints are fixed.

When an operation is decided upon as being necessary in any given case, it is performed by inserting a very fine knife under the sinew to be divided, which is kept on the stretch ; by a gentle cutting movement the sinew will at length be felt to snap. The knife is now withdrawn, and the small wound sealed up with antiseptic dressing and bandaged. The limb is then put into splints in such a manner that the deformity is corrected. In very severe cases more elaborate operations may be necessary.

FLAT-FOOT

Is a giving way of the normal arch of the foot, and most commonly comes on in late childhood. Every infant, when he begins to walk, is normally flat-footed, without any arch to the foot. When he has run about, however, for a few months, the muscles of the leg should become developed, and a perfect arch be produced. It will therefore be easily understood that flat-foot is caused by a weakened condition of sinews and muscles, and occurs in feeble or overgrown children, especially if they are rickety or have been suffering from one of the acute infectious fevers. Flat-foot is intimately associated with knock-knee, and one may induce the other; most children, too, with lateral curvature of the spine suffer from flat-foot, and any injury or disease of one leg, by making the child "walk false," is apt to produce flat-foot in the opposite limb. Flat-foot is known by making the child stand and bear his weight on each foot alternately, when it will be seen that the arch has given way to a greater or less extent, sometimes so much so that the inner ankle almost touches the ground. The pain caused by flat-foot varies considerably, and some of the slighter cases suffer the most.

Treatment.

Treatment consists (1) in strengthening the part by daily douching with cold water and applying hot, dry friction afterwards. Warm stockings must be worn, to prevent the feet becoming cold, and garters abolished. Massage to the muscles of the leg is also very useful. The child should be made to take one hundred steps every day, walking backwards and forwards on tip-toe with the heels raised, and another hundred steps walking on the outer edge of the feet, turning the soles inwards and forwards. (2) The deformity must be corrected by special boots, made without heels, and with a wedge-shaped pad corresponding in size to the hollow of the arch fixed inside. Felt or horse-hair makes better pads than solid rubber, and both are more comfortable than steel springs. The boots should be stiffened at the "waist," and made to lace up. In more severe cases an "artificial muscle" must be worn consisting of an outside leg iron, reaching to below the knee and attached to a rubber elastic cord fixed to a band round the ankle.

WRY NECK

Causes.

This consists of a contraction of one of the large muscles of the neck so that the head is drawn towards the shoulder and the face turned to the opposite side; it is not uncommonly met with during childhood. The cause of the contraction may be in the muscle itself, the result of injury during birth, the muscle being torn and a hard tender oval lump, of the size of a small walnut, being noticed a few days or weeks after birth. The lump gradually becomes smaller and is finally absorbed, but the injured patch in the muscle undergoes a steady contraction, getting shorter and shorter, and drawing the head to one side till it almost touches the shoulder. Sometimes children are born with wry neck, which is then probably due to a bad position of the child in the womb. In other cases the contraction of the muscle is produced by the irritation caused by disease of the upper part of the spine, abscesses in the glands, or inflammation of the muscles, nerves, or other parts in the neck. Such cases are often overlooked in their early stages, being put down to "stiff neck," "rheumatism," or "headache." In other cases, again, the contraction is spasmodic, due to some irritation of the nervous system, such as decayed teeth, worms, discharge from the ear, etc.; in this form there is continual and irregular jerking of the neck whenever the child is awake. Wry neck may also result from the contraction of a scar due to a severe burn or other injury.

Treatment.

In slight cases gentle friction and manipulation of the head should be performed every day, and the child be made to practise holding the head straight before a looking-glass. Should these measures not succeed, a special apparatus with an "artificial muscle" must be worn; in severer cases it may be necessary first to divide the muscle by a slight cutting operation. Spasmodic cases must be treated by the administration of bromide of potassium, 3 to 10 grains, thrice daily, according to age, combined with tonics. Massage and galvanism are also very useful. All sources of irritation should be removed, the child's mind occupied, and his general health carefully attended to.

KNOCK-KNEES

Unless corrected, this common deformity of childhood is apt to persist in later life; it is a mistake to imagine that the child will always "grow out of it." It does not always depend on rickets, but it is especially likely to be found in children who have been brought up by hand in unhealthy surroundings, being in some way associated with a low state of nutrition. Essentially, it is produced by a weakening of the ligaments and sinews of the ankle and sole of the foot, there being almost always flat-foot, as previously pointed out. The loss of support at the inner ankle causes extra pressure to fall on the outside of the bones of the knee, which hinders their growth, while the diminished pressure on the inside allows an excessive growth of this part. Growing children who have too much standing or walking to do, or who are obliged to carry weights on their heads, thus become knock-kneed. They are easily tired, and complain of aching in the legs and on the inner side of the knee ; they walk cross-legged, and appear to be short and stunted from the bending of the limbs. As the child stands, the legs form an angle with the thigh, but by placing him on his back and bending up the legs it will be found that they come into line with the thighs ; this is due to the leg slipping off the enlarged inner end of the thigh, which produces the deformity.

Treatment.

Besides attention to feeding and the administration of cod-liver oil and syrup of iodide of iron, it is important to keep the child entirely off his feet, and to bathe and rub his limbs well in front of the fire daily. The legs should also be manipulated by steadily drawing them straight for about ten minutes night and morning. If only one leg is deformed a well-padded splint should be applied to the outside and firmly strapped or bandaged. When both knees are affected, a firm pillow may be placed between them and the ankles tied together. If the deformity is at all severe, a special iron splint must be used with a spike at the lower end, which fits into a socket in the boot. The advantage of this splint (Thomas's) is that the child can get about from the first. In cases where the distortion is very severe, or the disease has existed for a long time and the bones are abnormally hardened, or where the child cannot be well looked after by way of keeping it off its feet and carefully adjusting the splints, an operation is required, with a view either to straightening the limb forcibly under chloroform, dividing the sinews, or cutting into the bone itself.

BOW LEGS, BANDY LEGS

These conditions are generally started by the peculiar habit formed by rickety children of sitting with the legs folded tailorwise, the deformity being merely an exaggeration of the natural curve of the leg under the influence of muscular contraction. Most commonly one leg only is affected, the other being the subject of knock-knee, which appears first. This is caused by the nurse carrying a soft-boned child always on the same arm, the left leg in that case becoming knock-kneed, while the right leg is pressed against it and grows bandy, by being, as it were, moulded to it.

The same attention to the general health must be given as has been described under Rickets. Care should be taken when the child is wheeled into the open air to keep the legs warm, so as to prevent the nutrition of the bones from being interfered with. With the same object, friction and massage twice a day after the bath should be practised. The child should be kept entirely off his feet, and a light splint applied to the inner side of the limb long enough to project some inches below the foot, so as to prevent him from attempting to stand. It should be borne in mind that rest is quite as important an item of treatment as the splint. Operation is hardly ever necessary.

Treatment.

CONGENITAL DEFORMITIES

Supernumerary Fingers and Toes.

Children are sometimes born with certain malformations due to errors in the development and growth of the body, or to some faulty condition existing in the womb or other structures connected with the child. To the former class belong supernumerary fingers and toes, which may be like ordinary fingers or toes, or merely fleshy projections with or without nail and bone. They may spring from the same part of the hand or foot as the other fingers and toes, or be attached to one of the others. Sometimes a finger or toe is double at the end, with two nails. Extra fingers and toes should be removed in infancy, so as to allow the others to be trained into their proper position.

Webbed Fingers and Toes.

The opposite condition to the above is that of webbed fingers and toes, in which there may be merely an extension of the usual web towards the tips of the fingers or toes, or a complete joining together of two or more digits; the union affecting the skin and muscles only, or even the bones themselves. Webbed fingers should be separated in infancy by operation; webbed toes do not require treatment.

Club-hand.

Club-hand is caused by arrest of growth in the bones of the hand before birth; it is not common, and can only be remedied, if at all, by massage, friction, and the use of splints. Sometimes the arrest of growth in one or other of the limbs is such that part of them is wanting, and in some cases this condition of things may have been caused by twisting of the cord round the limb in the womb prior to birth (intra-uterine amputation). Other deformities, such as a division in the breastbone, or absence of one or both collar-bones or shoulder-blades, are occasionally met with.

CONTRACTION OF HAND

Occasionally a peculiar deformity is met with in the hands of men in which one or more fingers are bent down into the palm. It is called Dupuytren's contraction, and is supposed to be often caused by some injury in those with a gouty tendency, but in many cases both these conditions are absent. The ring finger is chiefly and first affected, then the little finger, but the trouble may begin in or spread to any of the fingers, and may involve both hands. The tendency is for the contraction to grow gradually worse, until the hand becomes almost useless for all ordinary purposes. Some benefit is obtained by massage and friction of the affected parts and forcible stretching of the hand and of the tightened bands which can be distinctly felt in the palm. A firm splint or metal glove may be worn, especially at night, and this by means of screws may gradually stretch the hand. Ultimately, however, most of the cases come to operation, by which the hardened bands of fibrous tissue are dissected out entire. The general management of the hand must be continued even after operation, for there is a remarkable tendency for the contraction to return, and if the treatment is neglected for a time the whole trouble may become as bad as ever it was.

LATERAL CURVATURE OR WEAK SPINE

This is by far the most common form of spinal curvature, and generally appears between the ages of ten and eighteen, although it may commence either earlier or later. It is most common in the upper and middle, comparatively rare in the lower, classes; the female is more often affected than the male sex, especially girls of a weak or rickety constitution. Its production is also favoured by want of pure air and sunshine, insufficient food, premature and rapid growth, defective or improper exercise, such as carrying heavy babies and other burdens, habitual bad positions, such as lolling or sitting in cramped attitudes while writing or working.

If the back of a person suffering from weak spine be carefully examined, it will be seen that there are three curves. In an early case all these curves can be straightened out by making the patient bend forwards or lie down. At the same time flickering contractions of the muscles as they become tired are seen, when the patient continues to stand.

Lateral curvature may be very slight or very great, and if neglected becomes permanent, and the bones, besides bending to one side, become twisted on each other, so that the ribs become more or less flattened and straightened out, and the shoulder-blade does not rest evenly against the wall of the chest. This "growing out of the shoulder" is often the first thing noticed in this complaint, and has become the popular name for it. Prominence of the hip on one side is also often noticed. The consequences of bad lateral curvature are often very serious. The patient is liable to severe pains, cramp, and numbness. Emaciation frequently follows, and owing to the cavity of the chest being rendered more or less irregular or unsymmetrical, the heart and lungs are embarrassed and impeded in their functions; difficulty of breathing, palpitation and irregularity of the pulse often occurring. The progress of lateral curvature is extremely variable. It sometimes proceeds slowly and insensibly, sometimes rapidly, it may proceed to a certain extent and become stationary ever afterwards, or it may by proper means be in a great measure remedied.

Treatment.

Treatment has for its object the removal of the causes most influential in producing the curvature, the improvement of the general health, and the strengthening of the muscles. Hence, anæmia and dyspepsia must be treated; light, sunshine, and exercise in the open air, short of occasioning fatigue, must be encouraged. Walking is the best exercise, and next to that such exercises as will moderately engage the muscles of the arms, shoulders, and back, as the skipping-rope, dumb-bells, horizontal bars, and trapeze. Standing should at all times be avoided. When muscular debility is pronounced, it is generally of great service to have recourse to friction and douching with a strong solution of bay-salt. A reclining-board is also useful fitted with extension apparatus for the head and arms, for the systematic training of the spinal and other muscles; the patient should be made to rest prone for a minute or two between each exercise. Lying on the back for several hours daily is quite useless. Spinal supports must never be used except in conjunction with the exercises and other means already indicated, and they are best reserved for cases in which the patient is unable by a voluntary effort to maintain himself in an imposed position; they are otherwise as harmful in lateral curvature as they are beneficial in angular curvature.

ANGULAR CURVATURE

This complaint—also called Pott's disease, after a famous surgeon—is especially an affection of childhood. There is an inflammatory disease of the bones which form the spinal column, generally of a tuberculous nature. The predisposing causes are not unfrequently severe attacks of the eruptive fevers, especially scarlatina and measles, or a constitutional strumous taint. The immediate causes are exposure to cold and external injuries, as falls, blows, sprains, severe jerks, and sudden twists. Inflammation having commenced, it may continue a long time without giving rise to any severe symptom, until at last the movements of the spine, by perpetuating and aggravating the inflammation of the fibrous membrane covering the bones, cause thickening and swelling of it, which occasions pressure or irritation of the spinal cord, or the roots of the nerves, and the various spasmodic and paralytic symptoms which sooner or later supervene.

Causes.

The symptoms are therefore extremely delusive at an early stage, and before curvature becomes manifest. Pain is not a constant symptom even in the more inflammatory forms of the disease, especially at an early stage, and very often never amounts to more than an aching; while in the tubercular form pain may be entirely absent. As the disease advances pain is either more constant or more severe, especially in certain postures, or when bending the spine, and is sometimes increased by the application of warmth, as, for instance, a hot sponge placed over the affected part. The symptom is not constant nor of any great value, but firm pressure often reveals a tender spot. Further, there is usually pain along the course of the nerves passing out of the diseased part, attended by a sensation of constriction round the waist or in the belly (so called "dry belly-ache"). In addition, there is increased sensibility of the skin, and cramp or sometimes numbness of the limbs.

Symptoms.

Sooner or later in most cases an angular deformity makes its appearance, due to destruction of the "bodies" of one or more vertebræ, and consequent collapse of the column. The distortion varies remarkably in different cases; in the neck it is very slight, while in the back there is a corresponding deformity of the chest, the ribs are brought close together, and the shoulders are raised so that the head looks sunken between them. Children assume characteristic attitudes. Thus when the neck is involved the sufferer will support his head with his hands, and is slow and careful in turning round and stooping ; when the disease is in the lower parts of the spine the child bends the knees and hips, instead of bending his back, to reach any object on the floor. When the destruction of one or more of the vertebræ has proceeded to an indefinite extent, a reparative process (ankylosis) often begins, by which a material is exuded which becomes the seat of bony formation, cementing the adjoining vertebræ together and often partially filling up the spaces left by the destruction of the " bodies " of the backbone. In other cases matter forms, and an abscess results which tracks down the spine and gets into the sheath of a large muscle in front of it, called the psoas muscle, which it often destroys. The pus then may either pass out and form an abscess in the groin, or in the upper part of the thigh (psoas abscess), or appear in the buttock or back of the thigh, down which it may track for an indefinite distance. The disease may be further complicated by inflammation or paralysis of the bladder as the result of pressure on, or inflammation of, the spinal cord ; bedsores may form ; and paralysis of the lower limbs may occur, varying from mere weakness to complete loss of power. Death usually takes place from exhaustion, general tuberculosis, kidney disease, or blood-poisoning. The duration of the malady is rarely less than two or three months, and it may be as many years.

Treatment.

If inflammatory symptoms be present at an early stage, blisters over the seat of pain are valuable, using two or three in succession, or leeches may be applied. Absolute rest, giving immobility to the diseased bone, is imperative. When the neck is affected, the patient should lie on a hard mattress with a ring air or water cushion for the head, and with sandbags laid along each side of the neck and packed well in and secured. A special mattress with a hole in it facilitates the arrangements for the action of the bowels. When the active symptoms have passed off, and the pain, tenderness, and thickening have diminished, mechanical appliances are used with which the patient can move about, and the general health thus be improved. The appliance may consist of a Sayre's plaster-of-Paris jacket, with or without a jury-mast to keep the head fixed. Tonic treatment must not be neglected ; syrup of iodide of iron and cod-liver oil are indicated, with the best obtainable food and hygienic conditions. Abscesses that are on the point of bursting must be opened, while those that are stationary and without pain may be left alone, as the pus may be absorbed. Paralysis requires very careful management, and the utmost watchfulness to avoid bedsores, while if it resists treatment for a long time the question of trephining the spine (laminectomy) and removing the source of pressure will have to be considered.

SPINA BIFIDA

Is a congenital deformity caused by a failure in the growth of part of the bones of the spinal column, so that the spinal cord or its coverings protrude. It may occur in any part of the spine, but is more common in the lower part. The children who are the subjects of this deformity may be paralysed in the lower limbs—which are usually, in that case, wasted and malformed—and also have water on the brain and club-feet and hare-lip. They are often unhealthy and puny, and soon die, but in other cases are well nourished and robust. Spina bifida is recognised by feeling the edges of the opening in the spinal column, and by the presence of a round elastic swelling, filled with fluid, sometimes quite transparent, which becomes tense when the child cries. Some cases recover spontaneously, the swelling shrinking up and forming a puckered scar; but as most of the cases, if left to themselves, die of wasting or rupture of the tumour and meningitis, attempts should be made to effect a cure by injecting into the swelling from 15 to 60 minims of a solution of iodine in glycerine. Some fluid should be withdrawn before injecting, and the child should be kept on his back afterwards to prevent the injection getting into the spinal canal. The injections may be repeated every fortnight. One may suffice, or several be requisite. The proceeding is, of course, a dangerous one.

CHAPTER LV

DISORDERS OF BONES, JOINTS, AND TEETH

Acute Periostitis—Chronic Periostitis—Epiphysitis—Acute Synovitis—Chronic Synovitis—Hip Disease—Decay of Teeth—Difficulty in Cutting Wisdom Teeth—Toothache.

ACUTE PERIOSTITIS

Inflammation of the periosteum, the membrane that covers the bones, is a dangerous disease, which may lead to mortification of the bone and death by blood-poisoning. It is essentially a disorder of childhood, most commonly seen in young growing boys who are weak and badly nourished. It is rare in infants, and does not occur at all in grown-up people. The disease is, no doubt, due to an infective germ planted on a suitable soil, but introduced from without, yet it often is observed to follow some injury, perhaps trivial and forgotten, exposure to cold and wet, or an attack of one of the acute infectious fevers. The onset is marked by shivering and high fever, with the usual attendant symptoms, so that the child is thought to have some eruptive fever coming on. Sooner or later, however, there are pain and rapid swelling in the affected limb, usually in the leg, thigh, or upper arm. The skin becomes shiny, red, and tense, and painful to the touch, there is very high temperature—103° to 105°—and great exhaustion. If left to itself, matter will after a few days come to the surface, with relief to the symptoms and fall in the temperature, but usually matter forms again in other places, and through the openings pieces of bone find their way out, and the discharge continues until all the dead bone has been got rid of. The illness thus becomes a long and exhausting one, leading to extreme emaciation and to lowering of the vital powers to an alarming extent, and in addition there is grave risk of the occurrence of general blood-poisoning, which may end fatally from pleurisy, pneumonia, or inflammation of the heart. The greatest care must be taken to distinguish this disease from rheumatism, as recovery

Symptoms.

may depend entirely on prompt and effectual treatment. In rheumatism the inflammation will be found to be more or less limited to the joints, which will be especially painful when moved.

Treatment.

The treatment is essentially surgical. Free incisions must be made, immediately the disease is recognised, right down to the bone. The wounds thus made are plugged for a few hours to stop the bleeding, which is, as a rule, very free. The limb is then placed on a splint, drainage tubes are put into the wounds, which will require dressing every day or two, or more often if there is much discharge. Subsequent details must be left to the surgeon, as further incisions may be required from time to time, if there be rise of temperature or the formation of fresh abscesses, and pieces of bone may require removal. Some surgeons advise removing the whole bone at once from its sheath of periosteum, with the object of making the illness shorter and less exhausting. Sometimes, but not often, amputation becomes necessary if the neighbouring joint is attacked, or in feeble children in whom the discharge continues with signs of progressive weakness. As blood-poisoning comes on in these cases with great rapidity, a careful watch must be kept, and the child must have abundant nourishment, with stimulants and opium if necessary.

CHRONIC PERIOSTITIS

A much less severe form of periostitis is not uncommon in children, and is usually the result of some injury, such as a blow, or may come on after typhoid fever, measles, scarlatina, or acute rheumatism. In congenital syphilis also, limited patches of inflammation occur over the bones, sometimes in quite an acute form.

Symptoms.

A tender swelling forms over one of the bones under the skin, which may or may not be red; the pain is generally worse at night. The swelling may either subside or form a small abscess, which usually heals up without causing any inflammation of the bone, as in acute periostitis. In wasted and feeble children, a form of periostitis may come on in which there is little pain or inflammation or fever, but extensive abscesses are formed which may cause death by wasting and exhaustion, or by leading to pneumonia or diarrhœa. Another kind of chronic periostitis is associated with disease of the underlying bone, and is usually caused by syphilis.

When the pain is at all acute, the limb should be put on a splint and raised on a pillow ; leeches and hot fomentations will give great relief. In cases of less severity, hot lead and opium lotion or glycerine of belladonna is indicated, and when the pain is assuaged painting with iodine, or the application of a 5 or 10 per cent. ointment of oleate of mercury. Constitutional treatment in the shape of cod-liver oil and iron for weakly children and grey powder or iodide of potassium for the syphilitic must not be omitted. In cases where there is no improvement the bone will have to be cut down upon, with a view to letting out matter which has formed, or to relieve the inflammation in the bone itself.

Treatment.

EPIPHYSITIS

Inflammation of the growing ends of the bones is essentially an affection of infancy or childhood, and depends on some deterioration of the general health, especially congenital syphilis, acute rickets, and scurvy. More chronic cases usually follow some injury occurring in strumous children, such as jerks, blows, and falls.

Symptoms.

Sudden pain, sometimes agonising, with swelling near one of the joints, coming on in a child who is suffering from one of the complaints just mentioned, would probably be caused by epiphysitis. The inflammation often extends to the joint, and matter may form. A very mild form of this affection constitutes what is known as "Growing Fever," and occurs in children between the ages of seven and fifteen. In this condition there is pain in the ends of the bones and some feverishness, but it usually passes off without any bad result.

Treatment.

Treatment consists mainly of rest and attention to the general health, and to any syphilis or rickets which may be present. As the joints are often involved, and the proper growth of the bone interfered with, and as matter is not unfrequently formed, surgical aid must be sought in all cases of this disease.

ACUTE SYNOVITIS

Synovitis is the name usually applied to inflammation of a joint, because the lining (the synovial membrane) is the part chiefly affected. Acute synovitis is caused by injury, blood-poisoning, or rheumatism, and may occur in any movable joint in the body, which becomes swollen, hot, and painful, while there is a certain amount of general feverishness. The swelling is elastic, and is caused by fluid which forms inside the joint and alters its natural size and outline. When due to injury, all the symptoms gradually subside by rest and proper treatment, leaving, as a rule, no after-effects. When the trouble is due to blood-poisoning, however, matter may form in the joint, giving rise to high fever, severe illness, and probably resulting in permanent stiffness. When caused by rheumatism, it is likely to be followed by considerable stiffness, but not as a rule by the formation of matter.

Treatment. Absolute rest is essential, the limb being placed on a splint and raised. If the pain is very severe leeches will give relief, otherwise the application of an ice bag will suffice. In rheumatic cases hot goulard and opium lotion is indicated, with the administration of alkalies and salicylates. If matter forms, the case must be dealt with surgically and quinine given. Cases of less severity derive great benefit from blistering or painting with strong tincture of iodine, especially if the fluid in the joint is in large quantity, a condition known as "hydrops articuli."

CHRONIC SYNOVITIS

Is often a condition left from the acute form which has not got quite well, or it may start as a chronic inflammation due to some unhealthy condition of the blood, such as is met with in rheumatism, gonorrhœa, scarlatina, and typhoid. In this condition there is swelling of the joint, due not so much to fluid inside as to thickening of the lining membrane; there is less pain and tenderness than in the acute form. In bad cases the inside of the joint becomes so diseased and changed that permanent lameness may result.

Treatment. Counter-irritation should be made by blistering, during which the limb should be kept at rest on a splint. When the blisters have healed compound mercury ointment should be applied on strips of linen 2 inches wide and long enough to go round the joint and overlap. Eight or more such strips should be employed, commencing from below and reaching to well above the joint, each one overlapping the last. Over all this strips of diachylon adhesive strapping of the same size, spread on "moleskin," should be applied in the same way so as to encase the whole joint and make firm pressure on it. This may be worn some weeks. Sometimes these cases are very rebellious to treatment, and may require a long course of douching and massage to reduce the swelling and lameness. If, as may happen in strumous children, the inside of the joint becomes seriously diseased, it must be dealt with surgically.

HIP DISEASE

This term is usually applied to a chronic and insidious inflammation of the hip joint, generally of a tuberculous nature and almost entirely an affection of childhood, the largest proportion of cases commencing between the ages of three and seven years. It most commonly begins in the bones which form the hip joint, but may also originate in its lining membrane. It is met with in strumous, delicate children, and is often set up by some injury, either slight or severe, by over-use, or by one of the infectious fevers. Unless arrested by treatment, the whole of the joint soon participates in the inflammatory process, matter generally being formed, and the ends of the bones becoming destroyed, resulting in shortening of the limb, with more or less deformity.

Symptoms.

Some lameness and limping is usually the first thing noticed, and although it may be very slight, it is always present. At first there may be no pain, or only a slight aching, which passes off after rest, the child showing a tendency always to throw the weight on the sound limb. Later on pain becomes more marked, and may be limited to the joint itself, but very often is referred to the knee or inner side of the thigh and leg ; in many cases it comes and goes, sometimes disappearing for weeks. Starting pains, worse at night, are a prominent feature in more acute cases, and in chronic cases indicate that the disease is getting worse. The most constant and conclusive symptom is loss of movement in the joint, due either to muscular spasm or to a matting together of the structures forming the joint. The spasm is sometimes so great, and produces so much pain, that it may be necessary to examine the joint under chloroform to ascertain the extent of the disease. The position of the limb next becomes altered ; usually the thigh is bent upwards and drawn away from its fellow, while the foot is turned outwards, this being the posture of greatest ease into which the joint is unconsciously brought by the patient. The whole limb is also apparently lengthened, but this is really due to an alteration in the relative position of the haunches ; careful measurement shows that the limb is actually shortened, owing to the destruction and absorption of the bony parts forming the joint. Another early and prominent symptom is muscular wasting of the limb, and especially of the rump, which becomes flattened and the fold between this part and the thigh obliterated. This wasting is often remarkably rapid, and accompanied with coldness and swelling of the foot. In acute cases there may also be heat and swelling of the joint itself, and, in neglected cases, openings which discharge matter. Great care and surgical skill are required to distinguish hip disease from disease in the neighbouring bones or glands, from infantile paralysis, rickets, hysteria, and disease of the knee, the most satisfactory evidence of its *absence* being free, smooth, and painless movement of the joint. Unless effectually treated in its early stages, it inevitably results in destruction of the bones forming the joint, with abscesses and more or less shortening, stiffness, and deformity. Most sufferers die before reaching adult life either from exhaustion, disease of the liver and kidneys, tubercular meningitis, or the occurrence of some other illness, such as an acute infectious fever, which the patients are too weak to withstand.

Treatment.

Treatment, apart from the administration of cod-liver oil and iron, and the attention to the general health required in all cases of tubercular disease, is entirely surgical. Its main principle is rest, with fixation and extension of the affected limb by means of splints and weights and other mechanical appliances. In severe cases it may be necessary to remove by operation all the diseased bones which form the joint.

DECAY OF TEETH

The commonest disease of the teeth is decay, or caries, which consists in the gradual softening and breaking down of the bony substance. It is caused by acid fermentation in the mouth produced by micro-organisms, and is much encouraged by the retention of particles of food between the teeth, and by want of cleanliness. The tooth most liable to decay is the first permanent molar, which appears at the age of six. At first no pain is felt, but as the bony layer covering the pulp cavity grows thin, sharp pain is experienced on taking into the mouth anything very hot or very cold. Later, when the pulp is exposed, much severe suffering is experienced from the onset of inflammation. This may spread along the fangs of the teeth and involve the deep part of the gums, where it causes the formation of a minute drop of matter, which gradually works its way to the surface, and is called a gumboil. It is accompanied with a constant throbbing pain, swelling of the face, and tenderness and enlargement of the glands of the neck. It is the last condition which is of real importance, especially in children, for it may give rise to the troublesome tubercular disease of the glands so common in childhood. There is

Gumboil.

danger also that the matter may find its way to the surface through the cheek, and leave most disfiguring scars. This is particularly liable to occur when the teeth of the lower jaw are affected. As soon as the gumboil breaks the pain subsides, and the abscess may heal, but if the tooth is unattended to a constant discharge continues, which may not only cause pain and local mischief, but may injure the health.

Treatment.

The proper treatment for decay is to have the diseased bone scraped away and the subsequent hollow carefully "stopped," so as to prevent the soft bone of the interior of the tooth from being exposed to outside influences. When a gumboil is threatening, it may be checked by holding hot water in the mouth, or by laying a small piece of bread crumb soaked in water as hot as can be borne between the gum and the cheek. As soon as matter has formed it should be let out by the prick of a fine knife, which the dentist or the surgeon can do without the slightest pain by numbing the part with cocaine. If the matter shows a tendency to burst through the cheek, the decayed tooth should be at once extracted, and a prick made into the swelling in the mouth to enable it to discharge in that situation.

DIFFICULTY IN CUTTING WISDOM TEETH

The jaw is sometimes too small to give the wisdom teeth room to come through, and their appearance may in this way be much delayed or entirely prevented. The teeth then become displaced and their direction changed, so that when the mouth is shut in biting much pain is caused by nipping of the parts and pressure. Ulceration of the mucous membrane is set up, with much pain, the throat feels very sore, and the movements of the jaw are much impeded, forming a kind of false "lockjaw." The trouble is far more common in connection with the lower wisdom teeth than the upper. The pain in cutting these teeth is widespread, and is often mistaken for rheumatism. The trouble may sometimes be relieved by freely lancing the gum, but in most cases the tooth must be extracted. If the tooth next to the wisdom tooth should be decayed, it should be drawn, and the wisdom tooth will then come through the gum without difficulty.

TOOTHACHE

The pain of an aching tooth may be of a gnawing, throbbing, or shooting character, according to its cause. The shooting pain of a neuralgic toothache spreads to other branches of the same nerve, and may be felt in the eye, ear, or side of the head, and even in a different tooth from the one diseased. The offending tooth, however, may generally be recognised by its feeling tender when tapped upon. A neuralgia of this sort is often relieved by a good dose of quinine, a compound phenacetin tabloid, 10 grains of aspirin, or 15 drops of tincture of gelsemium in water. The gnawing pain of a decayed tooth is due to inflammation of the pulp or of the membrane which covers the bone (periosteum). Occasionally it is due to rheumatism, and is relieved by salicylate of soda or aspirin; iodide of potash, too, is useful, in 3- to 5-grain doses. The gums may also be painted with tincture of iodine or tinctures of iodine and aconite in equal parts.

Treatment.

A decayed tooth which is causing toothache admits of treatment applied to the hollow or cavity. This should be well cleaned out by washing the mouth with an antiseptic wash. Bicarbonate of soda placed in it sometimes gives relief. A very satisfactory course is to place a minute piece of cotton wool soaked in pure carbolic acid in the cavity of the tooth, using great care not to let it touch any of the surrounding parts, for it is an active caustic. It should then be covered with another small piece of wool soaked in friars' balsam or in mastic, 1 drachm dissolved in eau de Cologne 1½ ounces. Other useful preparations with which to ease an aching tooth are flowers of camphor 1 drachm, chloral hydrate 1 drachm, cocaine 5 grains; or oil of cloves, which may have 5 per cent. of cocaine added to it.

Diseased teeth are an important cause of disease of the antrum or hollow of the upper jaw (Vol. I., p. 64), for the fangs of some of them often project into it, and an abscess at one of their roots may burst into its cavity. If the teeth are extracted the discharge may be drained through the sockets and antiseptic lotions be injected.

Looseness of the teeth and their loss in rapid succession may be due to "spongy gums," which is often set up by decayed stumps that produce inflammation and an offensive mattery discharge. It is cured by removal of the bad teeth and the use of an antiseptic mouth wash containing carbolic acid.

CHAPTER LVI

DISORDERS OF THE BREAST AND LYMPHATIC GLANDS

Tumours of the Breast caused by Inflammation—Adenoma—Cyst—Cancer—Inflamed and Tuberculous Glands.

THE breast is liable to many affections which are definitely connected with its constant changes of activity. In childhood it is quite undeveloped; at puberty it grows rapidly, and becomes a gland ready to secrete when called upon; during pregnancy, and perhaps for some months afterwards, it is functionally at work; after weaning it returns to its inactive state, but may become temporarily swollen and full of blood during each menstrual period. At the change of life it ceases to be capable of further performing the functions of a gland, and gradually shrinks up and continues permanently inactive. These constant changes are liable to excite in the organ various diseased conditions.

The breast therefore is a gland, which is placed between the muscles of the chest and the skin. Its glandular structure is divided into lobules from which pass minute ducts or tubes; these unite to form larger ducts, which converge and open on the surface in the small folds of the nipple. This projects upon the surface of the gland and is surrounded by a dark circle of skin called the areola, upon which are visible—especially during pregnancy—many small raised bodies formed by the sebaceous glands. This cursory description will suffice to illustrate our remarks upon diseases of this organ, which will be limited to the various swellings that appear in it, and the means of distinguishing them from one another.

Much natural anxiety is always felt by a woman whenever she discovers that she has a lump in her breast, and her thoughts naturally turn with dread to the idea that it may be a cancer. Fortunately, it is only a small minority of swellings that are really cancerous. A tumour or lump may form in the breast as the result of a chronic inflammation.

This usually follows some event—such as pregnancy or miscarriage—which has stimulated the breast to action, and, curiously, is very seldom set up by an injury. It is excessively hard, grows very slowly and only to a moderate size, is accompanied with very little pain, cannot be moved about in the breast, but seems to form part of its structure, has no distinct edge which separates it from the breast, and, as a rule, causes some little swelling of the skin which covers it. Although not of a malignant nature, it is very difficult even for a skilled surgeon to distinguish this form of swelling from a cancerous tumour. This chronic form of inflammation has characters perfectly distinct from those of an ordinary abscess of the breast (Vol. III., p. 15).

Tumours caused by Inflammation.

The most common tumour of the breast is what is termed an adenoma. It usually occurs as the result of blows or squeezes, and is almost invariably met with in young women under thirty years of age who are quite healthy but are of nervous or hysterical temperament. It is generally first noticed when quite small, and grows very slowly, sometimes remaining stationary for many years. It can be moved about like a marble in the breast, does not affect the skin or cause the glands in the armpit to enlarge, and, as a rule, is quite free from pain. In young women with highly strung nervous systems, however, an adenoma is sometimes the cause of severe attacks of neuralgia, which are particularly likely to occur at the time of the monthly period. Such tumours are quite harmless, and not uncommonly entirely disappear in course of time. It is, however, sometimes necessary to remove them on account of the neuralgic pain or inconvenience they cause, especially if the patient's nervous system is upset by anxiety and dread of their being cancerous.

Adenoma.

Another variety of tumour is formed by the blocking of one of the milk ducts and the collection of fluid in it. A cyst is thus formed by the stretching of the duct. The tumour, although it contains fluid, is often very hard, rounded, painless, and of moderate size and slow growth, but reaching, perhaps, in course of time to even one or two inches in diameter. It does not affect the skin or glands. Such tumours are met with in women who are past middle age or who are approaching the change of life, and (generally) who have had children. Although there is no actual danger in the cyst, the disease occurs at a critical time of life, and cases are known in which cancer has developed in connection

Cyst.

with it, so that it is often considered wisest to have it removed by operation. There is no fear of its returning.

Cancer.

A cancerous tumour of the breast is most commonly met with in women from forty-five to fifty years of age, and seldom occurs under thirty. A lump in the breast under this age can therefore be regarded as innocent in character. It may be started by a blow or other injury, by eczema of an inveterate character affecting the nipple, or by inflammatory troubles which have accompanied nursing. It begins as a small hard rounded lump with little pain, continues to grow, becomes fixed to surrounding parts, and causes severe pain, especially at night. The skin is involved and is dimpled in, the nipple becomes less prominent and is retracted, the veins on the surface are enlarged and full, the glands in the armpit gradually enlarge, and the general health suffers severely, the body wasting and the complexion growing sallow and earthy. The only remedy is, of course, the early removal of the growth. With cancer generally we have already dealt (Vol. I., p. 34).

In spite of the distinctive features just described, it is very difficult to form a definite opinion of a tumour of the breast, and in many a case the most skilful surgeon finds his powers of diagnosis taxed to the utmost. It is always, therefore, wise to consult a medical man without delay when a lump in the breast is discovered.

DISORDERS OF THE LYMPHATIC GLANDS

It has elsewhere been explained that lymphatic glands are placed in certain positions (Vol. II., p. 83), and that the lymph is carried to them from all parts of the body by minute vessels called lymphatics. The glands act as filters to the lymph and arrest all foreign bodies, including germs, which it may contain. As a rule, the glands are capable of destroying germs and other poisons, and protecting the body from infection; but occasionally, if the poisons are present in large quantity, or the self-protective power of the body is diminished by ill-health, the glands are incapable of this office, and they then become inflamed, and may allow the poison to circulate.

When a gland becomes inflamed it grows painful, enlarged, and tender, and the parts in its neighbourhood are stiff and painful on movement. If the inflammation is not quickly relieved, matter will form, which will gradually work its way to the surface and break, leaving a ragged undermined hole in the skin, often resulting in a depressed and disfiguring scar. Inflammation of the glands is caused by any form of irritation of the parts from which is drawn the lymph that passes through them. Sometimes this may be so trivial and transitory that it may be quite unnoticed, or may heal and be forgotten. Cold, some trifling injury, a small sore of the skin or mucous membrane, are common instances. Eczema of the scalp, and the irritation caused by lice on the head, may enlarge the glands in the upper part of the neck; decayed teeth and sore gums, those below the jaw; discharge from the ear and sore throat, especially tonsilitis, those in the neck. Strains, as a result of walking too much, disease of the genital organs, especially syphilis and gonorrhœa, and irritation of the leg down to the foot, may inflame the glands in the groin. Vaccination sores and other affections of the hand and arm, and diseases of the breast, will involve the glands in the armpit.

Inflamed Glands.

Treatment.

The tender swellings should be smeared over with a liniment of equal parts of extract of belladonna and glycerine, and covered with a warm compress. The affected parts should also be kept absolutely at rest. This will necessitate confinement to bed if the glands in the groin are affected; support of the arm in a sling for the glands of the armpit, and a stiff high collar of wire or thick cardboard for the glands of the neck. When the tenderness has been subdued by these measures, the enlargement may be benefited by gently rubbing into it, night and morning, iodide of lead or mercury ointment, a piece the size of a pea. If, in spite of this treatment, the glands remain enlarged for two or three months, there is grave suspicion that they have become infected with the tubercle bacillus, and it will probably be necessary to remove them by operation to prevent a general spread of the disease. After a successful operation there is but little disfigurement from the scar.

Although there may be, as has been shown, a simple inflammatory enlargement of the lymphatic glands, by far the most common cause is the presence of tubercle. Syphilis also causes a general enlargement of the glands, and cancer affects those with which the lymphatic vessels of the affected part are connected. Another disorder of the glands is lymphadenoma, or Hodgkin's disease, in which they become enlarged, and may form large, unsightly tumours in the neck, armpit, or groin. This disease is most intractable to treatment, and usually ends fatally.

CHAPTER LVII

DISEASES OF THE RECTUM AND ANUS

Piles (Hæmorrhoids)—Fissure—Fistula—Prolapse—Stricture—Pruritus Ani.

PILES

Piles or hæmorrhoids are varicose veins of the end of the rectum—the lowest part of the bowel—which form small tumours, projecting into the bowels somewhat like a ring of small grapes. They are caused by anything that obstructs the circulation of this region. The most important are habitual constipation, the frequent use of powerful purgatives, congestion and sluggishness of the liver, pregnancy, hereditary tendency, a long residence in warm, moist, and relaxing climates, and the indulgence in a sedentary life with over-indulgence in eating and drinking.

External Piles.

They occur in two forms, named, from their situation, external and internal piles. The former are little more than flaps or folds of skin which surround the orifice of the anus, and may at times become swollen and painful. The latter are the true piles, which we have just described as being formed by varicose veins just within the anal aperture. External piles do not usually give rise to much trouble; they may cause a sensation of heat, pricking, itching, and fulness after the bowels have acted. But when they become inflamed and irritated, they cause a dull, aching, throbbing pain, which is increased by exercise and by standing, and which gradually subsides, leaving a hard and thickened flap of skin in which the blood has clotted.

Internal Piles.

Internal piles cause far more trouble. They set up sensations of heat, pricking, or smarting, which are much increased by every action of the bowels. There is a sense of something remaining inside, as if the bowel was not emptied, with a bearing-down sensation and a tendency to strain. Passing a constipated motion, and walking or standing about afterwards, increase the discomfort and irritation. The pain may spread widely to surrounding parts, and may be sufficient to affect the general health, and give the patient an anxious, drawn, and careworn look. After a time the piles are large enough to come down whenever there is the slightest necessity to strain, and they may become nipped by the muscle at the orifice of the bowel, and grow swollen, painful, and inflamed. This is what is called an attack of the piles. It may be brought on by the efforts to pass constipated fæces, by over-exertion, or by sitting on a wet seat, and it is often sufficiently serious to require confinement to bed for three or four days. There is sure to be at times a good deal of mucous discharge from the bowel, which annoys the patient much by staining the clothes. Bleeding is also a very common symptom of internal piles. It may be but a few drops after an action, streaks and spots on the surface of the motion, or a free loss of quite a large quantity of bright blood. It often gives relief to the symptoms, but, if frequent and long continued, injures the health and may set up a very extreme state of anæmia, accompanied with nervous headaches, palpitation, and a tendency to faint. It is important to note that the blood is not mixed into the motions, but is sprinkled or streaked on the surface, and may be splashed quite widely.

Treatment.

The cure of this troublesome complaint involves general and local measures. The former must be directed to removing the constitutional conditions which produce the disorder—in debility, tonics and nutritious food ; in plethora, reduced diet, avoidance of stimulants, and the limitation of animal food. A regular but gentle daily action of the bowels is essential, and this must be obtained by suitable food and the mildest of aperients that are found efficacious. One of the most popular laxatives is senna in the form of a confection, and it is usually given in combination with confection of black pepper, a teaspoonful of each—more or less, as is found necessary—every night at bedtime. A sulphur lozenge or two taken daily can be recommended ; or cascara, a teaspoonful of the liquid extract or a 2-grain tabloid.

In connection with the local treatment the utmost importance attaches to absolute cleanliness. The parts should be washed every night and morning as a part of the regular toilet, with very hot or with cold water, according to the patient's inclinations ; and besides this they should be well cleansed after every action of the bowels—by preference with soap and warm water. The most commonly used ointment is opium and galls, which is sedative and astringent ; hazeline cream and pilewort or celandine ointments are useful. Astringent injections sometimes give relief, about 2 ounces of any of the following being injected at a time: 20 drops of tincture of steel, 2 grains of sulphate of iron, 1 ounce of hazeline, or 15 drops of tincture of hydrastis, each with 2 ounces of water. Suppositories can also be employed. Cubebs 5 grains with cocoa butter, hazeline, anusol, belladonna and morphia, suprarenal extract, are all valuable remedies.

If the piles are extruded by straining or when the bowels act, they should be washed, smeared with gall and opium, or other ointment, and replaced by steady pressure applied with a piece of lint covered with ointment, the little operation being aided by bearing down gently.

For an attack of piles, the patient should go to bed, place himself on spare diet, and clear his bowels with Epsom salts or other simple aperient. He should bathe the piles with warm water or poppy fomentations, and smear over them one of the ointments previously mentioned, or extract of belladonna and glycerine. To check bleeding one of the astringent lotions should be employed, or the cubeb suppositories. It is found a good plan by many to acquire the habit of having the daily action of the bowels just before going to bed, so that it may be followed by a long rest in the recumbent position. It is also advised that only special paper be used, for the ink of printed paper is considered injurious.

All such measures proving ineffectual, a complete cure may be looked for by operation, but this will necessitate rest in bed for a fortnight or three weeks, followed by a quiet and restful change.

FISSURE OF THE ANUS

Sometimes people imagine they are suffering from piles when in reality they have only a fissure. This is a small crack, chap, or sore which is situated just inside the orifice of the bowel. It would be but a trivial matter were it not for the excessive pain and general nervous disturbance it produces. It is most common in nervous and delicate women, but is not unknown in men, especially those who have suffered from dysentery or other tropical complaints. By inserting the finger into the bowel an intensely painful spot is discovered, over which a small pile is often placed. The symptoms it produces are a severe burning pain during the passage of a motion, particularly if it be constipated; or the pain may come on a few minutes after an action and continue for a long time. It may spread widely from the spot, and in this way make it difficult to localise the trouble. It may be accompanied with spasmodic contraction of the sphincter muscle, and a frequent desire to pass water. Some slight bleeding often occurs when the bowels are opened. The nervous system is disturbed, the expression is anxious and careworn, and the patient may often postpone the action of the bowels from dread of the suffering it entails.

Treatment. The bowels should be kept regular and the motions slightly relaxed, so that the sore spot may not be unnecessarily stretched. This may be secured by cascara or lenitive electuary. The parts should be well washed with warm water after each action, and dried with a soft towel. A sedative suppository should be introduced night and morning, containing hazeline, or extract of belladonna 2 grains. By these means many a case is cured. Very obstinate cases may require a slight operation.

FISTULA OF THE ANUS

A fistula is a narrow passage that is most commonly left by an abscess in the neighbourhood of the anus, which has burst and never entirely healed. A complete fistula has one opening in the bowel and another on the surface of the skin close to the orifice of the bowel, whilst an incomplete fistula has only one of these openings. If in the skin it is termed a blind external, and if in the bowel a blind internal fistula. Consumptive persons have a remarkable tendency to this complaint. Its presence may be recognised by a constant moisture about the part, and a staining of the linen by the discharge. Sometimes there is a good deal of tenderness, but at others nothing may call attention to the trouble, and it may long pass unnoticed. The only satisfactory treatment is operation, the magnitude of which depends upon the distance from the anus at which the fistula opens, both externally and internally.

PROLAPSE OF THE RECTUM

Falling of the bowel in children has been described (Vol. III., p. 50), but a few words regarding the same condition in adults may be added here. In them it is more difficult to cure, for it has often lasted from childhood, and it is not suited for domestic treatment. The bowel should be pushed back into its place, constipation and straining avoided by the use of mild aperients, the diet should be restricted, especially as regards vegetables, a healthy amount of exercise should be taken, the affected parts should be bathed with cold water daily and after every action, and an injection of decoction of oak bark should be used. But in most cases the condition is quite beyond such simple remedies, and the case should be placed in the hands of a doctor.

STRICTURE OF THE RECTUM

This is a serious complaint, which calls for professional treatment. It may be caused by inflammation, the result of injury or ulceration, by syphilis, or by cancer, and the symptoms in the later stages are very distressing. They are pain, discharge from the bowel, irregular action, at times diarrhœa, but ultimately constipation, which becomes extreme, the motions being diminished in calibre and altered in shape. The general health is much affected. An inflammatory stricture may be kept open by the regular passing of an instrument called a bougie, but the syphilitic and cancerous forms require special treatment.

PRURITUS ANI

Itching or pruritus about the anus is a common and very vexatious complaint. Sometimes it occurs without any evident cause ; at others it is due to an unhealthy state of the intestinal secretions, to severe constipation, to the excessive use of coffee, to threadworms, to diseases of the womb, or to congestion of the mucous membrane of the rectum, or other affections of this part. At first nothing may apparently be amiss with the affected skin, but later the sores and marks caused by scratching are present. The causes, if recognised, must be removed and a suitable remedy applied. Some of the best remedies are menthol ointment, solution of cocaine 5 per cent., carbolic acid lotion (1 part in 40 of water), calomel powder dusted on, and " black wash."

CHAPTER LVIII

MISCELLANEOUS SURGICAL DISORDERS

Rupture — Varicose Veins — Syphilis — Gonorrhœa — Bubo — Gleet — Stricture—Diseases of the Testicle—Varicocele—Hydrocele—Spermatorrhœa—Abdominal Tumours—Disorders of the Eyelids—Gangrene.

RUPTURE

A HERNIA or rupture is the escape of a portion of bowel through a weakened spot in the walls of the abdomen, and the consequent formation of a lump or swelling. Ruptures may occur in many places, but those which are most important and most frequent are met with at the navel and in the groin. A rupture, therefore, is a swelling at one of these situations with certain peculiarities which enable us to distinguish it from other swellings. There is usually a feeling of weakness at the spot, which is often the sign that first calls attention to the unnatural condition. A bulging is noticed here upon any exertion or strain, gradually increasing to a distinct lump. This lump or swelling is, however, not permanent, but disappears under slight pressure and when lying down. It reappears at once on removing the pressure or upon again standing up. The lump grows distinctly larger upon straining or coughing, and if the hand be placed on it whilst this is being done a peculiar impulse or jerk is felt. When the lump slips back under the pressure of the fingers it does so suddenly, often with a gurgling sound.

The only two modes of treatment of rupture in an adult are wearing a truss for the rest of life, or an operation. Rupture in children is considered elsewhere (p. 51). The shape of the truss depends upon the variety and other peculiarities of the rupture, which can only be recognised by a surgeon. It must be worn whenever the erect position is assumed, and should be adjusted in its proper position whilst recumbent. Though irksome at first, it soon becomes as little inconvenient as clothing. An extra appliance should always be kept in reserve for fear of accidents, and a special waterproof-covered truss is useful for wearing in the bath. The great danger of allowing a rupture to remain down is that it may become strangulated ; that is, the protruding bowel may be nipped by surrounding parts—a most serious accident, which is frequently fatal. The symptoms are acute pain, violent and uncontrollable vomiting, and absolute constipation, due to obstruction. The rupture will now not disappear with pressure nor when lying down. A doctor should be sent for at once, and in the meantime the patient be put in a hot bath. No violent attempt should be made to press back the rupture or to make the bowels act, for injury may be done to the bowel, and aperients but add to the danger. If the doctor fails to reduce the rupture an operation is the only hope of saving life.

VARICOSE VEINS

Occasionally the veins become much enlarged and tortuous, and can be seen plainly in the skin ; they are then said to be varicose. The veins of the lower part of the body are chiefly affected, sometimes those of the rectum (piles), occasionally those of the spermatic cord (varicocele), but most commonly those in the legs. The enlargement is encouraged by anything that interferes with the free flow of blood out of the veins, such as long standing, habitual constipation, congestion of the liver, pregnancy, tight garters, and constant over-exercise. Middle-age and the female sex show special liability to the affection.

Varicose veins may exist without causing any trouble, but generally the symptoms complained of are an aching pain in the limb, with a sense of weight, fulness, and fatigue, and in some cases a numbness and weakness. The ankles are liable to swell after a hard day's work, and the feet are constantly cold. If the leg is examined, soft bluish swellings are seen, which vanish on pressure, but fill up again when it is removed. They disappear when lying down, but grow larger on standing up. In various situations dark bluish streaks occur in clusters, or long knotty convoluted swellings, according to whether the small or the large veins are involved, the spots they most frequently affect being in the middle of the calf, under the knee, and in the lower and inner part of the thigh.

The blood circulates so imperfectly through the skin of the affected part that roughness and irritation are set up, and even enlarging patches of eczema. These may gradually form distinct sores, called varicose ulcers, the favourite sites being a short distance above the ankle on the inner or outer side of the leg. Such ulcers are very inveterate to treatment, and are liable to grow larger in spite of every care so long as the patient keeps on his feet. It can be easily understood that the ill-nourished structures covering the enlarged veins grow thin, and that as the result of a sudden exertion or slight injury the veins may burst and severe hæmorrhage occur (see Burst Varicose Vein).

Treatment.

When varicose veins have formed in any marked degree, they can be much relieved, but can never be cured without operation. Fortunately, in most cases they entail no very serious consequences, but they do cause much inconvenience, and incapacitate the sufferer from many pursuits. In an early stage a long rest in the recumbent position would probably check the advance of symptoms, especially if all errors of living and unsatisfactory states of the general health were relieved at the same time. The health must always receive attention ; a debilitated and ill-nourished patient must be fed up and strengthened with tonics, a suitable one being the quinine and iron mixture (Pr. 161), with some regular aperient to prevent constipation. In full-blooded and over-fed persons the diet must be reduced, the bowels and liver freely acted on, and the general plethora reduced. In all cases the definite cause of trouble must be removed, such as tight garters, constipation, etc., and the veins must be supported by external appliances. A well-fitting elastic stocking is probably the most convenient, but a carefully applied bandage is equally efficacious. The ordinary indiarubber (Martin's) bandage is often employed, but it is likely to irritate the skin by preventing perspiration. The perforated variety is less open to this objection, or a thin flannel bandage may be worn underneath. A fairly thick crêpe bandage can be strongly recommended, as it is light, elastic, and porous. Bandages should be put on very evenly, beginning at the foot and ankle with firm pressure ; they should be applied above with a light hand, or they will obstruct instead of support the venous circulation. They should be put on before rising from bed, whilst the legs are horizontal, worn throughout the day, and taken off when in bed. In severe cases, and in patients whose occupation involves much active exercise, operation on the veins is required. It will end in a complete cure, but entails rest in bed and care for some weeks.

SYPHILIS

Symptoms.

The poison of syphilis may be inoculated on any part of the body, most commonly on the genital organs, but it sometimes finds an entrance through a small wound elsewhere, as on the fingers of medical men and nurses, at the nipple of a wet nurse from an infected child, on the lips from an infected cup or the kiss of a syphilitic person, and in past times on the arm in the vaccination wound when blood was conveyed with the lymph in arm-to-arm inoculation. There is then an incubation or latent period of about three weeks, after which the sore at the seat of inoculation undergoes certain changes, the chief of which is a hardening in its base, which makes it feel like a piece of cardboard in the skin. If treatment be energetic at this period, later symptoms may be avoided. In a short time there follows a painless enlargement of the glands in the groin—which feel like almonds—gradually spreading to all the glands of the body. Later still, six or eight weeks after inoculation, an eruption breaks out on the chest and abdomen, with sore throat and mouth, followed by disease in the eyes, loss of hair, and pains in the bones and joints. These are called the secondary symptoms, the original sore and enlargement of glands being the primary symptoms.

The secondary symptoms vary much in severity, according to the treatment employed, and the state of the sufferer's health. After from two to six months, or even longer, they subside under treatment, and the disease may be cured; but in a certain number of persons, months or even years later severe tertiary symptoms develop, which attack the skin, bones, and internal organs. These may cause great disfigurement and extreme ill-health, and when involving vital organs they often end fatally.

Treatment.

The drug usually employed in the primary and secondary stages is mercury, and if this is started sufficiently early, before the secondary symptoms appear, it is possible that these may be altogether prevented. The disease is of too severe a nature, too difficult to recognise, and too liable to produce disastrous sequelæ, to be suitable for domestic treatment. A common method of treatment is to take grey powder 1 grain, from 3 to 6 times a day, according to its effects, and continue it with occasional short intermissions for twelve months. If it causes diarrhœa small doses of Dover's powder are taken with it. During the course of treatment the patient must live carefully, avoid fatigue and damp, and take a very simple diet—omitting soups, green vegetables, fruit, and malt liquors—and should cleanse his mouth and teeth frequently with an alum mouth-wash. In the later stages of the disease mercury must give place to iodide of potash, which may have to be taken in large doses—10 or 15 grains three times a day—for the severe affections of internal organs, especially of the brain and nervous system. Other important facts which must be borne in mind are that the disease is contagious, the infected person being a danger to others, and that it is transmitted to the children of those who have not been thoroughly cured previous to marriage.

GONORRHŒA AND GLEET

By the name gonorrhœa is meant an acute inflammation of the mucous membranes, usually of the genital organs, produced by a special germ called the gonococcus. It is most contagious, the poison being communicated by direct contact. Men are more liable to it than women, and the following description will refer, therefore, chiefly to the male sex.

Symptoms.

After from three to five days from the date of inoculation, there is a feeling of heat, itching, and general irritation in the urethra or water passage. The orifice becomes red and swollen, and a mucous discharge exudes. From three to eight days later there is an abundant thick, greenish yellow discharge. Water is passed with great frequency, and is accompanied with much smarting and scalding, the urine passing with a diminished stream. A sense of weight and discomfort is felt in the fork, and there are restlessness and some fever. This acute stage lasts about a fortnight, when the symptoms begin to abate, the acute pain and swelling subside, the discharge becomes thinner, and the scalding passes off. In the course of another fortnight or three weeks, under suitable treatment the symptoms disappear, and the mucous membrane resumes its normal condition.

In neglected cases, however, a thin discharge may continue for months or years, constituting the condition termed gleet, and this may finally produce a thickened state of the mucous membrane which obstructs the passage and forms what is called a stricture. Sometimes the glands in the groin become inflamed, forming abscesses or buboes. The disease may spread deeply in men, and injure the generative organs, producing sterility; and in women may set up many serious internal affections. The constitutional symptoms are not, as a rule, of much importance, but in some cases a most intractable form of rheumatism is developed, called gonorrhœal rheumatism. The poison may also be inoculated on other mucous membranes besides the genital, the most important being that of the eyes. (*See* Ophthalmia Neonatorum and Purulent Ophthalmia.)

The treatment of gonorrhœa is directed to destroying the specific poison or germ, and allaying the acute inflammation. The patient should keep at rest, and if this is impossible a suspensory bandage should be worn. He should use warm hip baths and fomentations, should keep his bowels opened freely, should take a light slop diet, and should drink freely of water, linseed-tea, barley-water, soda-water, and milk, but avoid all stimulants. To allay the intense smarting in passing water the following mixture is recommended :—

Treatment.

PRESCRIPTION 302

Bicarbonate of potash . . .	2 drachms.
Tincture of hyoscyamus . . .	2 drachms.
Carbonate of potash . . .	1 drachm.
Tincture of orange	2 drachms.

Chloroform-water to 8 ounces.
An eighth part to be taken every 4 hours.

As the acute symptoms subside, but not before, special drugs must be employed, the above mixture being continued, as it aids them in their action. Capsules of copaiba, of sandal wood oil, or of cubeb oil, should be taken three times a day after meals. If the digestion is upset, a dose may occasionally be omitted.

In the later stages it will be necessary to stop the discharge by the use of astringent and antiseptic injections. These may consist of sulphate of zinc 2 grains, chloride of zinc 1 grain, sulphocarbolate of zinc 2 grains, or argyrol 40 grains, to 1 ounce of water. A glass syringe should be employed with a smooth rounded nozzle, and holding about 2 drachms. The urine should first be passed; a syringeful or two of warm water should next be injected to wash out the passage, and this should be followed by an injection of the lotion, which should be retained in the passage for a minute before being allowed to escape. The urine should not be passed for some time after the treatment. Instead of injections, bougies may be introduced into the passage—

sticks of cocoa butter several inches long, in which are mixed drugs such as iodoform, salts of zinc, bismuth, and lead, etc. They should be dipped in oil before being passed.

The treatment of gleet, or the chronic stage of gonorrhœa, requires stronger injections. The drugs already mentioned may be employed, but twice as strong. As the discharge may be maintained by a slight stricture of the passage, a metal instrument may be passed by a surgeon, which will often cure the trouble. This condition being more frequent in debilitated, gouty, or rheumatic conditions, general treatment to remove such conditions should be employed. Over-exertion, excesses at table, and the drinking of beer, effervescing and acid wines, are injurious, and to be avoided.

STRICTURE OF THE URETHRA

One of the remote results of a neglected or obstinate attack of gonorrhœa is a contraction or partial closure of the passage, called a stricture. This is also caused by injuries. Its presence is shown by a frequent desire to pass water, especially at night ; some difficulty and straining accompany the act, the clothes become wetted by the retention of a few drops, which trickle away afterwards, and the stream is smaller, less forcible, divided, or turned to one side. To cure a stricture, it is necessary for a surgeon to pass instruments by which the contracted part of the passage is gradually stretched to the normal size.

DISEASES OF THE TESTICLE

The most usual cause of an enlargement of the testis is inflammation (orchitis), though several varieties of tumour may form in it. Inflammation attacks either the body or the tube of this organ. In the former case it is due to some injury—a blow or strain—and perhaps to rheumatism ; in the latter, to a spread of inflammation from the urethra, either from gonorrhœa or from injury. Some attacks occur as a sequel of mumps. The organ enlarges, with severe pain, tenderness, and dragging in the groin. The ultimate results may be serious.

The patient should keep in the recumbent position and the parts should be supported on a small pillow or with a suspensory bandage ; hot fomentations or warm lead lotion should be applied, and an aperient, sedative, and fever medicine should be taken, such as the following :—

PRESCRIPTION 303

Epsom salts	1½ drachms.
Tincture of henbane . . .	½ ounce.
Antimony wine	2½ drachms.
Camphor-water to 8 ounces.	

An eighth part to be taken every 3 or 4 hours until the pain is relieved; then 3 times a day.

In the later stages the bark and ammonia tonic with iodide of potash (Pr. 166, Vol. II., p. 319) should be taken, and the testicle may be strapped with plaster.

VARICOCELE

When the veins which pass along the spermatic cord to the testicle become enlarged and varicose, they form what is termed a varicocele. It is met with most frequently on the left side, and feels like a "bag of worms." In moderate degree it is of no importance, and causes no symptoms, but if severe it produces a sensation of weight and dragging, and occasionally a pain of neuralgic character, especially on walking or riding. As it often causes much anxiety and mental distress, and may be the means of preventing exercise, active pursuits, and admission to the public services, an operation may be necessary. The veins are exposed by a cut in the groin, are tied and divided, and the condition is cured. In milder cases regular bathing with cold water, and the use of a well-made suspensory bandage, or the wearing of an indiarubber ring through which the lower part of the scrotum is drawn, are sufficient to remove the symptoms and keep the varicocele from enlarging.

HYDROCELE

A hydrocele (water tumour) is produced by the collection of fluid in the bag which surrounds the testicles. It may become so tense as to be mistaken for a solid tumour. It may affect children or adults, and often comes on gradually, without any definite cause. The swelling seldom reaches above the groin, and is translucent, but causes no symptoms apart from the dragging due to its weight, which depends upon its size. The treatment consists in the use of a suspensory bandage, with lead lotion or painting with tincture of iodine, whilst if the swelling continues to enlarge the water may be drawn off through a hollow needle. If these measures fail, an operation may be necessary.

SPERMATORRHŒA

A loss of the seminal fluid, whether in the urine as a discharge when straining, or as a sudden evacuation, if frequently repeated, is known as spermatorrhœa. It is more often imaginary than real, and causes intense mental depression and deterioration of health. The condition is perfectly curable, and should at once be placed in the hands of a trustworthy medical man, who, by microscopic examination, may prove it to be unimportant, or if it is severe he may by suitable treatment completely remove it. Tonics, cold bathing, hygienic surroundings, and satisfactory mental occupation will always restore the health, whatever may have been the original cause of the trouble. The sufferer should be careful not to resort to patent remedies.

ABDOMINAL TUMOURS

Enlargement of the abdomen may be due to the growth of a tumour, but in the majority of cases is caused by a much less serious condition. Distension with wind, or flatulence, is a common cause, when the swelling is observed to come and go, to be large at one time and small at another —a sign impossible with a tumour. Many a woman who imagines she has a rapidly growing tumour is only affected with an enormous growth of fat in the wall of the abdomen. This is particularly likely to occur after the change of life, and although it causes much inconvenience, is not dangerous, and can usually be relieved by wearing a well-fitted abdominal belt, which should be tightened from below upwards, so as to raise and support the flabby and pendulous abdominal wall. The accumulation of water in the abdomen, called dropsy or ascites, causes its enlargement. It is due to disease of certain organs, especially the liver, and is recognised by the shape of the belly, which is flat in front and bulging out at the sides when in the recumbent position. In women one of the most common tumours is an ovarian cyst. This gradually enlarges, and may attain enormous dimensions. It can hardly be recognised without medical knowledge, but if recognised can be removed by operation, which is accompanied by wonderfully little danger, considering the magnitude of the procedure, and health is completely restored. All the abdominal organs may be affected by various kinds of tumours, of which many of the more common forms have already been described.

DISORDERS OF THE EYELIDS

Stye.

A stye is a minute abscess round the root of an eyelash. It begins at the very edge of the lid as a small red swelling, which sets up a feeling of stiffness and itching. The redness and swelling increase and spread, perhaps involving the whole lid and completely closing the eye. In a few days matter forms and shows itself on the surface of the stye ; it then bursts and discharges, the symptoms rapidly subsiding and the lid soon assuming its natural appearance. Styes are more common in children than in adults, and especially in those who are naturally delicate, or who are out of health. In such they are liable to occur in rapid succession, when they require constitutional treatment and improvement of the general health. The bowels should be regulated, the diet should be simple, plentiful, and nutritious, and cod-liver oil with steel wine should be administered. Locally, frequent fomentations with hot water or warm compresses should be used until the stye bursts. It should never be rubbed or squeezed, and a prick is seldom required unless the pain and swelling are extreme.

Meibomian Cyst.

The eyelid is supplied with a number of small Meibomian glands (*see* Vol. II., p. 39), which secrete a lubricating fluid that is discharged along a minute duct opening at the free edge of the lids. If the duct becomes blocked, the secretion collects and forms a little swelling or cyst. This, by rubbing against the eye, causes irritation and a watering of the eye. If this secretion cannot escape it sets up inflammation in the cyst and forms an abscess, which can be seen on the inner surface of the lid as a yellow mattery spot. This may break by itself, but the proper treatment is to make a small prick with a knife and turn out the little hardened mass of secretion.

These cysts are most common in the lower lid, whilst styes occur chiefly in the upper.

"Live Blood."

A very troublesome twitching of the eyelid sometimes occurs, which goes by the name of "live blood." It is due to a spasm of the circular muscle of the lid, and is more common in persons of an irritable and nervous temperament. It is occasionally the result of digestive disturbance, especially connected with threadworms, and should be treated with a few doses of aperient medicine, followed by tonics.

Delicate children are liable to a chronic inflammation of the edges of the lids, which is really a chronic form of eczema. If it is allowed to go on unchecked, it is very liable to destroy the hair follicles, so that the eyelashes cease to grow; the condition then goes by the name of "blear eye," and is most disfiguring. Another serious trouble which follows neglect of inflamed lids is ingrowing lashes. Sometimes three or four fine hairs are turned towards the eyeball, or a single hair may grow in this direction. This condition, even when present in only a slight degree, causes much annoyance by a sense of pricking and a constant irritation and watering of the eye. The treatment consists in carefully pulling out the offending lashes with a fine pair of forceps from time to time. The operation seems a simple one, but it is very easy to break off the hair in the attempt to pull it out, and the stiff stump left behind will cause more trouble than the original fine point. The hair should never be jerked out, but removed with a slow, steady pull. The original inflammation should be recognised early and treated without delay. It produces soreness and redness of the edges of the lids, along which discharge and crusts collect and mat the lashes together. These crusts should be removed carefully night and morning, and it is well to cut the lashes short to facilitate treatment. Yellow oxide of mercury ointment (9 grains to 1 ounce of vaseline) should be painted along the margins of the lids with a brush. The child should be put on a course of cod-liver oil, and the syrup of iodide of iron.

Blear Eye.

Ingrowing Lashes.

The lids sometimes turn inwards from the frequent contraction of the orbicular muscle. This is commonly seen in children who are suffering from inflammation of the eyes (conjunctivitis) with great sensitiveness to light. It is relieved by painting the lid with contractile collodion, which draws it outwards to its proper position. At the same time the inflamed eye must be cured by suitable remedies (Vol. II., pp. 53, 54), or the lids will again give trouble.

Inversion of Lids.

A similar condition occurs in old people from a relaxed and flabby state of the lid and its muscles. If it is not relieved by collodion, a slight operation should be performed.

GANGRENE

Gangrene, or the death of a part, is called mortification, and occurs in many conditions already referred to under different headings.

Hospital gangrene, a disease due to putrefactive germs, was a not unfrequent cause of severe illness and death before the introduction of the antiseptic treatment, but is nowadays very rare. In severe injuries, however, with acute and violent inflammation, gangrene of wounds is still met with (Vol. II., p. 82). The destruction of parts as the result of exposure to severe cold is also a form of gangrene (see Frost-bite). The curious condition called Raynaud's disease may in its extreme forms proceed to gangrene of the extremities (Vol. I., p. 217). Also the dangerous inflammation of the cheek which occasionally affects ill-nourished children, called cancrum oris, is a gangrenous affection (Vol. III., p. 55).

A strange form of gangrene, known to occur occasionally in this country, was not uncommon in France, where it broke out in terrible epidemics in the last century. It is believed to be due to the continued eating of bread made of rye in which a certain fungus had grown. This parasite is called *Claviceps purpurea*, or ergot of rye. It is used in medicine for many diseases, and when taken in the food for long periods has most serious consequences, which are collectively called ergotism. Not only may convulsions appear, but often also gangrene of the extremities, from which much mutilation and even death may result. As ergot has a powerful action on the involuntary muscular fibres, the occurrence of the disease has been explained by a contraction of the small arteries of the limb, which deprives the parts of all nourishment. Gangrene is sometimes met with in the late stages of diabetes. It is also one of the diseases of old age, and is then due to the gradual obliteration of the small arteries by atheroma (Vol. I., p. 213). In this affection, named senile gangrene, the toes gradually become shrivelled up, black, and dead. The onset of mortification, therefore, though serious, is not necessarily the immediate forerunner of death, as is popularly believed.

PART IV

AMBULANCE WORK, OR FIRST AID TO THE INJURED

CHAPTER LIX

THE HUMAN SKELETON

Introductory—Bone—Periosteum — Epiphysis — The Skeleton — Skull — Spine—Thorax—Pelvis—Femur—Tibia and Fibula — Patella — Foot — Clavicle — Scapula—Humerus—Radius and Ulna—Hyoid Bone.

Introductory.

The teaching of first aid to the injured was initiated in this country by the St. John Ambulance Association in 1877. Its intention, in the words of the Association, " is to give some plain rules to non-professional persons, to enable them to render immediate aid in many of the cases of accident or sudden illness which occur in our daily life. It is not intended to supersede the medical man, but to point out what may be done to the patient before his arrival." This knowledge is not simply the exercise of common sense; it must be gained by study of the principles involved, and by mastering the simpler facts of the anatomy and physiology of the human body. No one without this knowledge would be able to treat the emergencies of sudden hæmorrhage or unconsciousness, or would understand the importance of care and gentleness in the handling of broken bones. It is, however, perfectly easy for everyone to learn enough to be of great use in the emergencies that all have at some time to meet. Many a life has been saved by timely aid given in cases of drowning, hæmorrhage, or poisoning by those who have taken a course of ambulance instruction; and much suffering has in the same way been spared to those who have been subjected to such injuries as fracture of bones, concussion of the brain, and severe wounds.

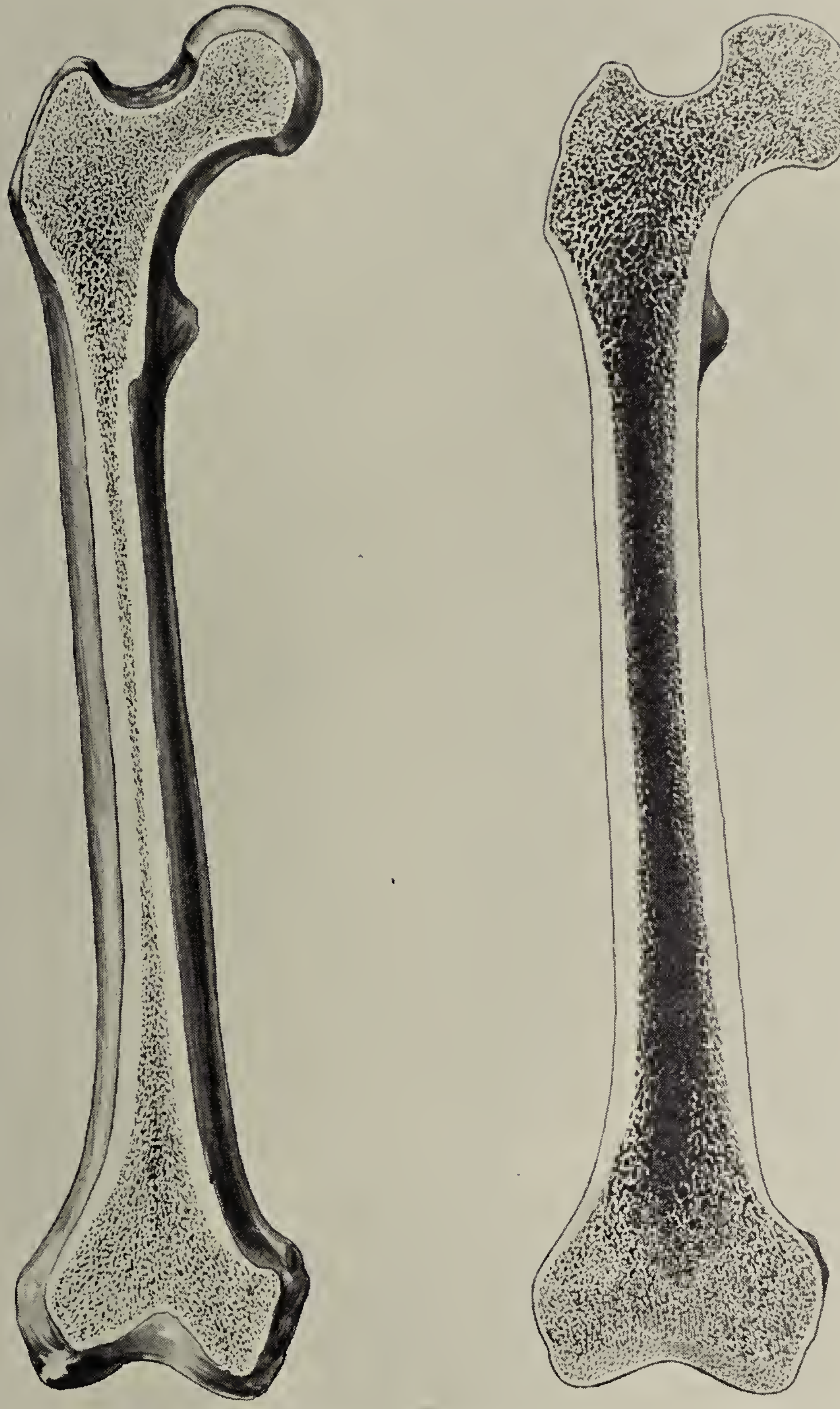
Fortunately for the community, the knowledge of first aid has become almost a fashionable accomplishment, and not to know how to apply a simple bandage or what to avoid in dealing with an accident is felt to be a thing to be somewhat ashamed of. First aid, however, means what its name implies, and no more; it is not intended to supersede the doctor, but only to fill the gap between the occurrence of an accident and the arrival of skilled assistance. This interval is a time of the utmost importance, during which an enormous amount of harm may be done by ignorant meddling, but much good by those who have taken the trouble to acquire the principles of first-aid treatment.

The whole body is moulded upon the skeleton or bony framework, and it is of importance before rendering first aid that a proper knowledge should be obtained of the bones and their structure, as well as their situation. It is hardly to be expected that anyone ignorant of the chief facts regarding the skeleton should be able to recognise such conditions as fracture or dislocation of the bones and treat them intelligently. In other parts of this work there will be found chapters describing the organs by which the work of the body is performed: here we will give some account of the human skeleton.

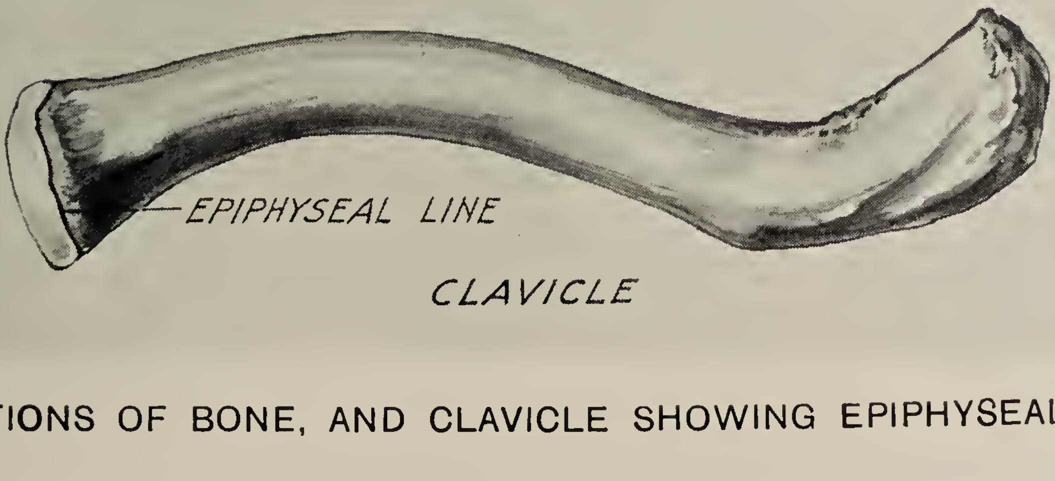
Bone.

Bone is composed of two parts—(1) a soft, animal, organic material; and (2) a hard, mineral, inorganic material. The first gives to it its shape and tenacity, and consists chiefly of gelatin; the latter its hardness and rigidity. At birth the bones are chiefly formed of the inorganic matter, and are therefore soft, pliable, and easily altered in shape. As they grow older the inorganic matter is slowly deposited in the substance of the organic, in the form of minute grains of lime salts—phosphate and carbonate of lime—and if through ill-health or an insufficient supply of the lime salts this deposition is imperfectly carried out, the bones remain soft and ill-formed, and become twisted and bent. This condition is commonly seen in children who are the subjects of rickets (p. 29), and explains the development of many deformities, such as knock-knee and bow-legs. The soft portion of bone is living material, and after death becomes decomposed and destroyed, but the hard part still retains the shape of the original bone, and forms the skeletons exhibited in museums. It is capable of remaining unchanged for hundreds of years, as is proved by the existence of skeletons of antediluvian animals.

The exterior of bones contains much more of the mineral substance than the deeper parts, and is much denser in its structure, appearing



OUTER & INNER SECTION OF FEMUR



CLAVICLE

SECTIONS OF BONE, AND CLAVICLE SHOWING EPIPHYSEAL LINE

almost like ivory. As the interior of a bone is approached, the small interstices which exist in the hard bone are seen to grow larger, until the open spaces are sufficiently large to be seen by the naked eye ; the bone is then called spongy, or cancellated. In the long bones—as those of the limbs—the spongy bone forms the chief part of the enlarged ends, and is covered with but a thin layer of hard bone. The long thin shafts are, on the other hand, formed chiefly of compact substance. The flat bones, such as form the skull, consist of two plates of hard bone, inclosing between them a layer of soft substance, and it is possible for one hard layer to be broken and driven into the soft part without the other hard layer being injured. This is an important fact in connection with some cases of broken skull. The lattice work of fibres (cancelli), as has been explained, grows larger as the centre of the bone is approached, until it finally disappears, leaving a cavity or hollow in the centre of the long bones. This is the marrow cavity, and is filled with a soft fatty substance called the medulla or marrow.

Periosteum.

The entire surface of all bones is covered with a thick fibrous membrane—the periosteum—which is freely supplied with blood-vessels and nerves ; these pass from it to the bone and penetrate its structure. It can easily be understood from this description that if the periosteum be torn off at any part or separated from the bone by a collection of matter or blood, the minute blood vessels which pass from it to the bone are torn across, and the surface of bone beneath, starved of blood, dies.

Epiphysis.

In the process of development the bones are at one period formed of gristle (cartilage), and the lime salts are gradually deposited in it, beginning in long bones at the middle and spreading towards the ends. Other centres of ossification or bone-formation also appear in the enlarged extremities, and grow from them towards the middle. In this way a band of soft material is formed across the bone near to the ends, called an epiphysis. It is the last part to become bony (in some situations not until adult life), and is the chief seat of the growth of the bones in length. This is a fact to be remembered in connection with broken limbs in children, for in them the bones are very liable to break across this soft part, and the result is, if the injury is not carefully treated, that the bone fails to grow, and becomes stunted.

The human skeleton is made up of about two hundred separate bones, bound together by various means and shaped according to the duties they have to fulfil. They are long and thin, as in the limbs, to give reach and mobility; short and thick, to support weight, as in the spine; flat and curved, as in the skull, to protect their contents, and provided with knobs and projections to provide attachment for the many muscles of the body.

The Skeleton.

The skull or head is made up of twenty-two bones; eight of these form the cranium or brain case. They are flat and in adults firmly fixed together, but in infants they are separated by bands of soft material, to admit of the growth of the brain. Their edges are irregular, fretted, and locked into one another, and present great strength in resisting pressure. The frontal bone forms the forehead, the two parietal bones the top of the head, the occipital bone the back of the head; the two temporal bones the temples and internally the cavities of the ears; the ethmoid (or sieve-like) bone and the sphenoid (or wedge-shaped) bones the under part or base of the skull. The various bones which form the base of the skull are pierced by a number of small openings, through which pass the blood-vessels and nerves; the largest opening of all being called the foramen magnum, through which the spinal cord passes from the skull to the canal of the vertebral column. The remaining fourteen bones compose the face, and are all firmly fixed together except for the lower jawbone, which works with a hinge joint on the bone of the upper jaw. Seven of the face bones take part in forming the nose: its bridge is made by the two nasal bones, part of the partition between the two nostrils by the vomer (or ploughshare), the tear ducts which lead from the eyes by the lacrymal bone, and the various projections in its interior by the two turbinate bones. The remainder of the face consists of the two upper jawbones, the two cheek or malar bones, and the two palate bones. These form with the other bones the orbits or sockets for the eyes, the nasal cavities, and the mouth.

The Skull.

The spinal column, or backbone, consists of a large number of small bones called vertebræ, and forms a long canal in which the spinal cord is placed. It extends from the base of the skull above, through the neck, back, and loins, to the small pointed extremity or tail bone. The seven upper bones are the cervical or neck vertebræ, the next twelve the dorsal or back vertebræ, the five below the lumbar or loin vertebræ. These are called the true vertebræ; the "false" vertebræ are the five sacral bones which are fused together in the rump

The Spine.

bone or sacrum, and lastly, the four small terminal bones, which unite to form the tail bone or coccyx.

The first or uppermost neck vertebra is called the atlas, from its bearing the weight of the skull, to which it is firmly united, two good joints being formed by means of which the nodding movements of the head take place. The second neck vertebra is called the axis, and forms with the atlas a joint that allows the free movements of the head from side to side. The seventh cervical vertebra forms a distinct projection at the back of the next, and is therefore named the vertebra prominens. The twelve vertebræ which make up the back differ from all the others in that each of them bears a rib on each side. The loin vertebræ are the largest and thickest, as they have to bear the weight of the whole spine above them, and they rest on the broad solid mass of the rumpbone. The little coccyx—which is so called from resembling a cuckoo's bill—is the part of the spine which by great development forms the tail of the lower animal

The whole of these bones are firmly knit together by firm bands and cords around them, and between them are placed thick pieces of gristle, the intervertebral cartilages, which not only hold them together, but allow a large amount of movement and pliability in the column as a whole, and by being elastic are the means of guarding the spinal cord and brain from the jolts and jars to which the body is exposed.

The Thorax.

Attached to the spinal column are a number of bones which are said to form two girdles. The upper of these is the arm, the lower the pelvis and leg. Between them is placed the chest, or thorax. The chest is composed of twelve ribs on each side, which are long, thin, curved bones, extending from the back vertebræ behind to the breastbone in front. It thus forms a sort of crate, and serves to protect the important organs within it. The seven upper ribs are termed the true ribs, and connect directly with the breastbone ; the lower five are " false " ribs ; three connect with the breastbone by long pieces of gristle (the costal cartilages), the remaining two are loose, and are therefore styled floating ribs. The breastbone, or sternum, is shaped somewhat like an ancient sword ; it forms the front part of the chest, and extends from the neck to the pit of the stomach. To its upper end is attached the collar-bone, and along its sides the ribs.

The pelvic girdle, or pelvis, forms a sort of basin, composed of thick bones. At the back are the sacrum and coccyx ; at the sides extend the solid thick haunchbones (or innominate bones), which, attached firmly to the sacrum behind, join each other in front at the joint of the pubes. They are curved inwards below, and with the sacrum and coccyx form a partial bottom to the basin. On the outer surface of each haunchbone is a deep cup, which is the socket for the thighbone, and forms with it the hip-joint.

The Pelvis.

The thighbones are the largest and strongest of the body, and extend from the hip to the knee; they are round and arched forwards. At their upper end is a rounded head, which stands off at an angle from the shaft of the bone on a narrow neck. Their lower ends are spread out and divided into two smooth rounded surfaces, which form the knee-joints. The technical name for the thighbone is the femur.

The Femur.

In the leg there are two bones, the shinbone, or tibia, and the fibula. The latter is known by many names—the splintbone, the peroneal, brooch, or buckle bone. The shinbone, much the larger of the two, is placed to the inner side, and is triangular in shape. Its sharp edge is only just under the skin, and can be felt throughout the greater part of the leg, forming the shin. At its lower end it forms a distinct knob, which projects downwards at the side of the ankle. At its upper end it is fixed to the thighbone and forms the knee-joint, whilst below with the fibula and bones of the foot it takes part in the ankle-joint. The fibula is a long, thin bone, running along the outer side of the leg, where it is covered with a thick pad of muscle, and it can only be felt at its upper and lower ends. It takes no part in forming the knee-joint, as it is fixed at its upper end to the side of the shinbone, but below it forms the outer part of the ankle-joint.

Tibia and Fibula.

The kneecap, or patella, is a thick triangular mass of bone with its point downwards; it lies in the centre of the large fibrous band or tendon of the massive muscle of the thigh. It assists by its presence in the straightening of the thigh and protects the front of the knee-joint from injury. It can be easily felt immediately beneath the skin.

The Patella.

The foot is made up of many bones, twenty-six in number, which are divided into three sets. The first are seven irregular-shaped bones which make up the tarsus. One of these, the astragalus, forms the lower surface of the ankle-joint; another, the os calcis, is the large mass of bone which projects into the heel. The second set are five bones which constitute the metatarsus; they are long and thin, and project forward from the tarsus, forming the chief part of the foot, and each one is connected with a separate toe. The third set are the phalanges, small, narrow bones, fourteen in number, three to each toe except the biggest, which has but two. These various bones are so arranged as to form a firm but elastic support for the body, and at the inner side of the foot are raised from the ground, in a beautiful arch, the two piers of which are tied together by a strong band or ligament, and thus provide the foot with its spring and elasticity. If the ligament give way from overstrain or debility a flat foot develops. The lower limb is formed with the idea of firmness, stability, and strength, and not like the arm, for lightness, great range, and rapidity of movement.

The Foot.

The Clavicle.

The only bony attachment of the arm to the trunk is by the collar-bone, which is fixed to the upper end of the breastbone. In this way the upper limb is held away from the body and allowed to move freely in every direction by the gliding movements of the bladebone on the surface of the chest. The collar-bone is long, and thin, shaped somewhat like an italic *S;* it is also called the clavicle (*clavis*, a key), from its similarity to an old-fashioned key. It lies just beneath the skin, and can be distinctly felt throughout its whole length, lying at the lower and front part of the neck and just above the top rib. Attached, as we have said, to the breastbone at one end, it is fixed to the bladebone at the other, forming the prominence of the shoulder, and protecting the upper part of the shoulder-joint. By reason of its double curved shape, it has great elasticity, and is thus capable of resisting severe blows on the shoulder without breaking. However, the bone is thin and fragile for its exposed position in the body, and is more often broken than any other bone.

The Scapula.

The shoulder-blade, or scapula, is a broad, flat, triangular bone, which is attached to the outer end of the collar-bone above the shoulder-joint, and extends backwards towards the spine at the back. Just underneath its attachment to the collar-bone is a somewhat hollow surface, into which the armbone fits; the socket is very shallow, in order to allow freedom of movement to the shoulder-joint, in marked contrast to the deep hollow for the head of the thigh-bone. As a natural result the shoulder-joint is easily dislocated, more often indeed than any other joint.

The Humerus.

The armbone, or humerus, is a long, strong bone, which extends from the shoulder to the elbow, forming the latter joint by its connection with the two bones of the forearm. These are called the radius and ulna. The radius is placed on the thumb side, or what is spoken of as the outer part of the forearm. It is small above at the elbow-joint, and has a rounded head, which is jointed to the ulna; below it is broad and thick, and with the small bones of the hand forms the wrist-joint. The ulna is large above, where it is provided with a hook shaped process called the olecranon, or, in popular phrase, "the funny bone." The ulna forms the large part of the elbow-joint, but, being quite small at the wrist, takes but little part in the structure of that joint. When the hand is twisted round, these two bones roll round one another, the hand being carried on the radius.

Radius and Ulna.

The Hand.

The bones of the hand are very similar to those of the foot; there are eight small bones, which constitute the carpus; some of them are in contact with the radius, and form the wrist-joint. Next there are five long, thin bones, which lie in the palm and form the metacarpus, and thirdly there are fourteen phalanges, three to each finger and two to the thumb.

The only bone to which we have not yet referred is the hyoid bone; it is situated in the neck, between the chin and Adam's apple, is like a U in shape, and is unconnected by any bony attachment to the skeleton.

CHAPTER LX

MINOR ACCIDENTS AND INJURIES

Foreign Bodies in the Eye, in the Ear, in the Nose, in the Throat and Air Passages, in the Flesh—Bites and Stings—Injury from Caustics—Bruises.

FOREIGN BODIES

In the Eye.

Flies, insects, or hard particles often enter the eye and set up inflammation and severe pain. If the eyes be closed and the uninjured one be rubbed, a flow of tears is produced which may wash the intruder to the corner, from which it can be easily removed. The lower eyelid should be drawn down and its surface examined, and if the irritant can be seen it should be picked off with the corner of a clean handkerchief or a soft brush.

Sometimes hard pieces of grit, as from a locomotive, become imbedded in the cornea, and their removal must not be attempted except by a surgeon. Until his arrival a few drops of castor-oil, or of olive-oil, or of a solution of cocaine, should be placed in the turned-down lower lid to obtain relief from the pain, and a pad of cotton-wool applied over it and fixed with a bandage to keep the eyeball from movement. When the particle is under the upper lid it is not easy to extract, but sometimes drawing the upper lid as far as possible over the lower one will lead to its being wiped off by the under lashes. If this fails, the upper lid should be turned back. The little operation is performed as follows: Make the person sit down and lean his head back, then stand behind him and rest his head against your chest to steady it. With perfectly clean fingers take hold of the edge of the lid with one hand and turn it upwards, whilst with the other hand the lid is steadied and pressed downwards with a thin rod laid along the length of the lid about ½ inch from its edge. A thin pencil, a match, or a knitting needle is suitable for the purpose. It is necessary to take hold of the lid itself, not the eye-lashes. Having everted the lid, examine it carefully in a good light for the foreign body, and remove this when found, with the wetted corner of a handkerchief or clean brush.

Lime in the eye is best treated by dropping in castor-oil or weak vinegar and water.

In the Ear and Nose.

Insects may crawl into the ear passage, or in children hard objects may be pushed into it. As a rule, there is no hurry to remove such things, for they can do but little harm. It is better to wait for hours for a doctor than attempt to extract them by picking them out with some hard instrument. The means by which they may be removed are described elsewhere (Vol. II., p. 69).

Pebbles, beads, dry peas, and such-like things are sometimes stuffed up the nostrils in play, and become fixed there. To get them out the other nostril should be closed by pressure with the finger, and the child should then blow through the obstructed nostril, or be made to sneeze by sniffing a pinch of snuff up the unaffected nostril. Or the nostril may be cleared by syringing. But there is no great hurry in removing such obstructions, as they can do no harm for a few hours, at any rate.

In the Throat.

Fish-bones, pins, and other sharp bodies sometimes stick in the throat and cause much alarm, and no little discomfort. The best way to remove them is to pass the finger well back into the throat and dislodge them with it. They may also be carried onwards by eating some dry food such as a slice of stale crumb of bread, or by swallowing water in gulps. There is no real danger, and if they become fixed they can be easily removed by a doctor. The sensation of a bone sticking in the throat often continues long after it has been swallowed, from the slight injury to the mucous membrane it has left behind it.

In the Air Passages.

By taking a sudden deep breath with something in the mouth, the object is sometimes drawn suddenly into the larynx. The result is a violent choking fit, in which the face grows red and swollen, with violent cough and difficulty of breathing. A portion of food is usually the offending substance, but larger bodies—such as a set of false teeth—have been known to cause suffocation by blocking up the air passage. If the cough fails to remove the obstruction, the patient may be forcibly patted on the back, and, if a child, may be held head downwards. Or the finger may be passed down the throat, after something has been placed between the back teeth to prevent its being bitten, and the body may be thus dislodged.

If this causes vomiting no harm but perhaps good may follow. Such an accident is sometimes accompanied with real danger, and the doctor on his arrival may think it necessary to open the windpipe to restore respiration and save life.

Foreign Bodies Swallowed.

Substances may be swallowed upon which the digestive juices have no effect. The consequences which result from such an accident depend upon the nature of the foreign body. If it be a coin, marble, pebble, or other small object which is round or flat, but little anxiety need be felt, for it will be passed in the motions without discomfort in the course of a few days, perhaps in forty-eight hours. If, however, it be an irregular-shaped object, as a bone or a plate of artificial teeth, there is more trouble in getting rid of it. Pins and needles also may be swallowed, but are generally carried along by the contents of the bowels and evacuated without trouble. The first impulse after such an accident is to give a dose of castor oil, but this is wrong. Encourage constipation rather, and give plenty of solid and somewhat dry food, with eggs, cheese, and similar articles of diet.

Foreign Bodies in the Flesh.

A needle which has entered the flesh and broken off requires immediate attention, and the case should be placed at once in the doctor's hands. The remaining portion should be kept, as it will be a guide in treatment. Nowadays the situation of the imbedded portion can be discovered by the X-rays ; it will usually require a cut with a knife to remove it. If a fish-hook be run into the skin it must not be dragged out, but should be cut short and pushed onwards, so that it can be withdrawn at another spot.

BITES AND STINGS

The bites of animals are bruised wounds, and do not heal well. The bleeding from them is not severe, and can be easily stopped ; the wound should be carefully washed with an antiseptic lotion, and covered with a piece of lint, linen, or calico soaked in the lotion and kept in position with a bandage. When the bite is that of a dog, cat, fox, wolf, deer, or other animal liable to rabies, there is always the fear of the development of hydrophobia. The wound has then to be subjected to special treatment (see Vol. I., p. 365). Although lunar caustic is better than nothing, it is far safer to use a fluid caustic or a red-hot instrument.

Stings of insects are not dangerous unless many are inflicted at a time, when severe symptoms may arise. But stings of the tongue and throat may cause suffocation from the amount of swelling which is produced. The parts should be well washed with salt and water or sal-volatile and water.

In those bites in which the sting remains imbedded, it can be removed by squeezing or by pressing the barrel of a key over the spot. The pain may be relieved by washing with sal-volatile, liquid ammonia, spirits, a strong solution of washing soda, or the application of the blue bag. In bites of the harvest bug the little animal is imbedded, and must be picked out.

INJURY FROM CAUSTICS

Strong acids and alkalis both cause severe injuries to any part of the body which they touch. Burns caused by acid substances should be washed free of the acid with warm water and washing soda, or may be dusted with chalk or whiting. They should be then washed with plain water and treated as an ordinary burn.

The wounds caused by caustic *alkalis* should be washed with vinegar and then dressed like burns.

BRUISES

A bruise or contusion is produced by a blow which does not produce a wound, but tears some of the structures beneath the skin, blood being poured out from the small vessels torn. If larger vessels are injured the blood collects in large quantity. The discoloration of the skin is caused by the blood soaking through and undergoing chemical changes.

The first treatment necessary is to check the bleeding, and this can be done by the application of cold and pressure. A piece of ice, cold water bandages, a cold metal body as a key, or a bit of raw beef steak, are various means of applying cold. A firm bandage with a pad of lint or cotton-wool is the best form of pressure.

A black eye should be treated by firmly pressing a handkerchief wetted with cold water over it and by cold water bathing. Very hot water has the same effect as cold.

The blackness of a crushed nail is due to bruising, and cold water will often prevent it.

In the later stages, to hasten the disappearance of bruises hot fomentations should be employed. If the bruise becomes painful, inflammation is threatening, and may be warded off by warm compresses with rest of the part.

CHAPTER LXI

WOUNDS

Classification—Treatment—Cleansing and Dressing Wounds—Dressings—Incised, Punctured, Lacerated, Contused, Poisoned and Gunshot Wounds—How Wounds Heal—After-treatment—Injuries of Internal Organs.

A WOUND is defined as a breach of the skin produced by violence, sometimes involving the deeper parts. They are divided into six distinct classes—namely, incised, punctured, lacerated, contused, poisoned, and gunshot wounds, a classification important not only for descriptive purpose, but in respect to treatment, which varies according to the variety of wound.

Classification.

Incised wounds are caused by a sharp clean instrument, such as a knife or a piece of glass. The edges are clean cut, and the symptoms produced are pain, bleeding, and separation or gaping of the edges.

Punctured wounds are made by narrow, sharp-pointed instruments, such as a knife, dagger, or bayonet, and vary much in importance, from the prick of a needle in the finger to a sword thrust through the body. The edges are usually driven inwards by the weapon, and are somewhat bruised and lacerated. The chief danger is from injury of underlying structures, such as large blood-vessels, or important organs, causing severe internal hæmorrhage and shock.

Lacerated wounds have their edges torn and jagged, as when parts are torn off by machinery, or are mutilated by the bites or claws of animals. They are usually bruised, cause but little bleeding, and give rise to a dull, aching pain.

Contused wounds are the result of blows from blunt instruments or against hard objects. Their edges are irregular, split, and discoloured by bruising. They do not gape much, bleed but slightly, ache severely, heal after much destruction of skin, and are often accompanied with a good deal of inflammation.

Poisoned wounds may partake of the characters of any of the preceding, but their special feature is the introduction of some poison, either at the time of the injury or at a later period. The poisons may be those of insects, snakes, rabid animals, of lockjaw, or of other disease germs. Wounds infected by disease germs are termed septic, and are very dangerous from their liability to cause severe blood poisoning. They can usually be guarded against by proper first-aid treatment.

Gunshot wounds are necessarily bruised and torn. They may be small and in large numbers when caused by shot, or severe and dangerous when caused by bullets or larger projectiles. Their special dangers arise from the possibility of severe injury to internal organs, and the lodgment of the bullet in the body. If the latter condition is present there will be but one wound; but when the bullet leaves the body two openings will be found, the wound of entrance being small and depressed, and the wound of exit being larger, with jagged and turned-back edges.

Treatment.

The treatment of wounds is one of the most important duties of those rendering first aid, for by suitable measures adopted immediately on the infliction of the injury much serious trouble may be avoided in the future. The first thing to be done is to stop the bleeding as soon as possible, and the method of procedure described under Hæmorrhage must be followed. If signs of internal bleeding are present, such as faintness and shock, keep the patient very quiet, in a recumbent position, with the head low; allow him plenty of fresh air, loosen his clothing, and give him ice to suck. Apply also a bagful of broken ice over the injured part.

The next principle which must be learnt is that absolute cleanliness is essential, in connection with the hands, the wound, and the dressings. This is the essence of antiseptic treatment. In ordinary surgical practice it is the custom to boil all instruments, to sterilise all dressings with heat, especially those that come in contact with the wound, to wash the hands thoroughly and constantly, and lastly to employ antiseptics. These are drugs which have the power of preventing the entrance of germs into the wound, or of destroying them if by accident they have entered. Antiseptics are mixed with water to form lotions with which the hands of the surgeon, his instruments, and the wound are thoroughly washed, and in which the dressings that are to come into contact with the wound are soaked. They are also used to impregnate all lint, gauze, wool, and bandages which are used as dressings. Carbolic acid 1 part to 40 of water, perchloride of mercury or biniodide of mercury 1 grain in 4 ounces of water, are the antiseptics most used in surgical practice, but a host of others are employed by individual surgeons. They are strong poisons and therefore dangerous drugs for use in first-aid treatment. The best—because safest—antiseptics for domestic use are Condy's fluid, or permanganate of potash, a few crystals in water to produce a pale purple colour ; boracic acid, a dessertspoonful to a tumblerful of water ; izal 1 in 200, chinosol 1 in 1,000, Sanitas, Jeyes' fluid, creolin, and lysol. Unfortunately, under the circumstances in which first aid to the injured is usually called for, none of these drugs is likely to be at hand, and cleanliness must be obtained without them.

Cleansing and Dressing Wounds.

If *clean* water is at hand and the wound is *dirty*, wash it out thoroughly and then cover it up. The most simple and handy form of dressing is a clean handkerchief folded as a pad and soaked in cold water. If no water can be obtained, fold the clean handkerchief up and tie it over the wound; whilst if even this cannot be obtained, cover the wound with clean white paper and fix it with a handkerchief, necktie, or anything else that is handy.

Dressings.

In every household dressings for wounds should be kept. Boric lint and cyanide gauze are two of the best ; they may be applied dry or wetted with water, and covered with cotton-wool or Gamgee tissue. Boiled water should always be used to wash the wound and wet the dressings. The smooth side, or back of lint, should be placed next a wound ; if the woolly side be applied it will stick, and cause pain when removed.

The third principle to remember is to keep the injured part completely at rest ; this may be best done by putting the patient to bed. If the leg is wounded, splints may be necessary to obtain rest ; if the arm, a well-applied sling may be sufficient.

Incised Wounds.

Having stopped the hæmorrhage and cleaned the wound, the edges, which are sure to gape, must be drawn together. This may best be done with plaster, which should be cut into narrow strips and laid across the wound whilst the edges are held together by pressure of the fingers on each side. There should be intervals left between each strip, and the lowest corner should be left unclosed in order to allow any discharge that may form to escape. Over this a dressing should be placed and secured by a bandage or folded handkerchief.

Punctured Wounds. In punctured wounds, after checking the bleeding and washing the wound, no attempt should be made to close it up with strapping, but it should be covered with a dry dressing. If foreign bodies have entered but are out of view, thev should be left until the doctor arrives.

Lacerated Wounds. Lacerated wounds having ragged edges should not be closed with plasters; they should be well washed and covered with a dressing. The hæmorrhage is, as a rule, very slight, and requires no special treatment. A free discharge of matter is to be expected.

Contused Wounds. A bruised wound should not be closed with plaster. Wash it, cover it with a dressing, and apply a firm bandage to check the oozing of blood. The hæmorrhage, however, is not likely to be severe. The part should be rested. The wound will take long in healing.

Poisoned Wounds. Poisoned wounds are particularly dangerous from the poison that has entered; they may require the application of caustics, as when caused by the bites of dogs or snakes. If due to dirty instruments or occurring under unhealthy conditions, the use of antiseptic washing is of great importance. They are very likely to suppurate and be affected by erysipelas and other germ diseases, complications which may be prevented by careful first-aid treatment.

Gunshot Wounds. Wounds caused by bullets combine the characteristics of punctured, lacerated, and contused wounds. They are also often complicated by the presence of a foreign body which may have carried dirt and portions of clothing with it. Bleeding must be checked, the wound washed, and covered with a warm water or antiseptic dressing. No attempt should be made in first-aid treatment to remove the foreign bodies. If the bones are fractured the proper treatment for fractures should be applied. If shock occur, measures should be taken to relieve it.

How Wounds Heal. The several varieties of wounds we have been describing may heal in various ways, and five methods of repair are recognised by surgeons. The first is called healing by *immediate union,* and consists in the direct growing together of two opposed surfaces. The wounded parts stick together and become continuous without inflammation and without new material being formed between the surfaces. It is but seldom that this form of healing is met with, especially in accidents which occur under circumstances that prevent immediate treatment of the wound. Occasionally after operations even large wounds have been known to heal in this way.

The second method of healing is more important as being far more commonly met with; it is called *union by first intention*, or primary adhesion. As soon as the bleeding has ceased and the edges of the wound are brought together, there oozes from the blood a small quantity of sticky fluid, which forms a sort of "glaze" between the opposing surfaces. This glues them together. A moderate degree of inflammation is set up in the immediate vicinity of the wound, which causes it to be red, swollen, and tender, and produces a slight discharge of sticky and somewhat bloodstained fluid on the surface. This layer of glue becomes gradually changed into fibrous tissue, which firmly binds the cut edges together.

The third method of healing is by *scabbing*, or under a scab. A crust of dried blood and discharge collects over the wound and forms an air-tight covering, shutting out all germs and dirt. If oozing of discharge occurs, the scab is loosened, and this form of healing ceases. It is not common except in small and superficial injuries. This natural process is sometimes imitated by the surgeon, who covers over a small wound with a piece of lint soaked in blood, collodion, or other material so as to form a kind of scab under which healing may take place. It can easily be understood that this method is only possible when air is at once excluded from the wound, and no foreign body or germs have found admission. In the wounds which a surgeon sometimes makes through a small valve-like opening called subcutaneous, the healing process follows this method.

The fourth form of healing is that by *granulation* or, as it is sometimes called, *by second intention*. In this condition the gluey substance which collects on the surfaces of a wound is excessive in quantity, and forms a layer of small red masses, which are called granulations. They are full of blood, and from their surface pour a thick yellowish mattery discharge. Gradually the deeper part of this layer becomes changed into fibrous tissue, the wound contracts and grows daily smaller, and finally the surface becomes covered with a thin bluish-white layer of epidermis, which spreads from the old epithelium of the surrounding skin. In this way are healed ulcers and all wounds which are bruised or torn, which have been closed with much blood between their surfaces, or have been contaminated by germs, dirt, or foreign bodies.

The fifth form of healing is named *union by secondary adhesion.* In it granulations form as just described, and if the two layers of granulations are brought together and kept in contact they stick together and heal.

Healing by First Intention.

The aim of a surgeon in treating wounds is to obtain union by first intention. And herein lies one of the great possibilities of first-aid treatment, that by suitable measures applied immediately on receipt of an injury, the wound may be placed in such a condition as to heal by this method. In order that this may take place it is necessary that the wound be closed, that its sides be brought into accurate apposition, and that the air be excluded. These conditions cannot be expected in any but incised wounds, and only in those if they are treated carefully and correctly, all bleeding checked, all foreign bodies and dirt particles removed, and decomposition prevented. We have already described (p. 222) how important is the use of antiseptics in the attainment of these objects.

Incised wounds, therefore, may heal by first intention, punctured wounds under a scab, contused and lacerated wounds by granulation.

It is not possible to obtain healing by first intention in bruised and torn wounds, for the edges are so much injured that the tissues on the surface are destroyed, and must first be shed in the form of discharge before any close apposition of the edges can be obtained ; large portions also may die and separate as sloughs.

After-treatment of Wounds.

Incised wounds or clean cuts, which are capable of healing by first intention, and have been treated by first aid with a suitable dressing, can be left alone for many days, even up to a week. If the dressing be then removed, the wound will be found healed. Those wounds, however, which have been bruised or torn, and the edges of which have not been brought accurately together, should be dressed daily. All discharge should be washed away by syringing with some warm antiseptic lotion, a fresh dressing applied and fixed in position with a bandage. A careful watch should be kept on the dressings, which should be inspected occasionally, and if discharge or blood has soaked through to the surface the soiled dressings should be removed and fresh ones applied.

If much pain and throbbing are felt in the wound—especially if accompanied by fever—there is probably matter forming. It is then necessary to remove the dressings and allow a free vent for the discharge from the wound. This untoward complication is most likely to show itself about the third day from the accident. The lower part of the wound must be opened, pieces of strapping or stitches removed, the wound thoroughly washed with warm antiseptic lotion, and hot boracic fomentations applied to it frequently. As soon as the symptoms of inflammation have subsided, the fomentations may be discontinued and antiseptic dry dressings reapplied. Those wounds which are healing by granulation may in their later stages, when they have formed superficial sores or ulcers, be dressed with some simple salve, such as boracic ointment or hazeline cream. If they are obstinate in healing, zinc ointment is more suitable, or a small compress of red wash.

Materials for dressings which may well be kept always at hand are boracic lint, cyanide gauze, absorbent cotton wool, boracic ointment, zinc ointment, carbolised vaseline, Condy's fluid, weak carbolic acid, and some triangular bandages. They should be kept in an air-tight tin, and never be left exposed or lying about. To ensure the cleanliness of dressings, it is necessary to place them in a closed tin in a hot oven for half an hour.

INJURIES OF INTERNAL ORGANS

A serious danger of most wounds is that some internal organ may be implicated. This is particularly likely to accompany punctured wounds produced with a sharp instrument and gunshot wounds. Such a complication is, as a rule, recognised by the presence of severe shock, the symptoms of which are described elsewhere. There will also be the special signs connected with the organ affected. When the heart is wounded death is usually very rapid, and but little can be done to afford relief. The lungs may be wounded in stabs or bullet wounds, and also when a rib is broken by direct violence, the broken ends being driven inwards and tearing the pleura and lung. The patient then becomes collapsed and faint, and suffers from difficulty of breathing, painful cough, and spitting of bright blood, which is frothy from admixture of air. The symptoms of internal hæmorrhage (which see) may set in from hæmorrhage into the pleural cavity.

Lay the injured person down on the spot where he is, and do not let him attempt to walk to a bed or sofa. Keep his head low, turn him over to his injured side, allow him plenty of fresh air and keep him cool. Cold—especially ice—may check the bleeding ; small pieces of ice may be given to him to suck, and ice or cold water may be applied to the wound. This should, if possible, be covered with antiseptic dressings, and care should be taken not to bandage the chest tightly, or the injury may be increased by pressing the broken rib against the lung.

Wounds of the intestine are dangerous, from the escape of their contents setting up acute peritonitis and wounds of the solid organs—liver, spleen, kidneys, etc.—from the excessive hæmorrhage that occurs. A wound of the abdominal wall should be well washed with warm water containing an antiseptic, if any can be obtained—boracic acid, a tablespoonful to a pint of water, being the most suitable—and then covered with a pad of clean dressing, which should be kept in position with a firm bandage. The patient's position should be such as to avoid making the wound gape ; he should lie with the legs drawn up for a transverse wound, but straight out for a vertical one. Anything that may protrude through a wound should be kept as free from exposure to the air or dirt as possible ; it should be covered at once with a clean rag wrung out of hot water, and the patient kept absolutely still until the doctor arrives. Suspicion of a wound to the *stomach* is confirmed by the vomiting of blood, which may be bright and plentiful, or merely dark and like coffee-grounds. The patient should be laid flat, nothing should be given to him to drink, and an ice-bag should be applied to the pit of the stomach.

Wounds of other organs should be treated upon similar principles —absolute rest in the recumbent position, the avoidance of stimulants if hæmorrhage is severe, cold to the part to check the bleeding, and cleanliness of the wound, which should be at once washed and covered up from the air.

CHAPTER LXII

BURNS AND SCALDS, ELECTRICAL INJURIES, AND LIGHTNING-STROKE

Burns—Treatment—Scalds—What to do when Persons are set on Fire—Electrical Injuries—Lightning-Stroke.

A BURN is caused by dry heat, a scald by moist heat, but the results are very similar. The injury caused by a scald, however, is seldom so deep or severe as that caused by a burn.

Burns.

Burns are divided into classes, according to the severity of the injury. The first class includes those in which the surface of the skin is scorched, the second those in which the whole thickness of the skin is implicated, and the third those in which flesh as well as the skin is destroyed. The deeper the burn the worse is the scarring which results. Much disfigurement and even deformity may follow a deep burn, and the knowledge that this may occur should make us very careful in our treatment of the sufferer. He should be kept very warm, completely at rest, and if severe collapse set in stimulants should be given.

If he recover from the shock, inflammatory reaction sets in during the following day or two, and internal complications may be met with in the organs beneath the burnt part if it be situated on the trunk. A frequent complication of severe burns, especially when they affect an extensive surface, is inflammation and the formation of ulcers in the upper part of the small intestine (duodenum). This most commonly occurs during the first fortnight after the accident, and its symptoms are very indefinite, but include vomiting and diarrhœa. The treatment of inflammatory internal complications consists in attention to the diet and to the sustenance of the strength, with complete rest and quiet.

The pain of burns is usually excessive, and generally requires the administration of sedative drugs, such as opium and morphia, for its relief. These may have to be given even to children, though with great care. The shock of burns often shows itself in children by convulsions, which indicate the need for sedatives also, the most suitable being bromide of potash.

Severe shock may be caused by a very extensive burn, even though it may be only superficial.

Treatment of Burns.

The first step in treatment is to remove the clothing from the injured part. This must be done with the greatest gentleness, every care being taken to avoid breaking the blisters and dragging away the loosened skin with the clothing. The best plan, if the clothing has stuck to the burnt skin, is to cut away the surrounding parts and leave the attached portions. These should then be well soaked with olive oil until they are loose. The boots should not be dragged off, but the laces should be undone and the back of the boot cut open with a knife or scissors, so that it may be removed with ease ; the stockings also must be slit up until they are free of the injured part.

The next step is to cover up the wound from the air. This can be done by sprinkling flour, starch, arrowroot, or powdered chalk over it, and then placing a thick layer of cotton wool over it and fixing it in position with a bandage, which should be lightly applied. Linen soaked in olive-oil or carron-oil, or smeared with vaseline or other simple ointment, is a very suitable dressing. Carron-oil, which is one of the most popular, consists of equal quantities of linseed-oil and lime-water; it is found cooling and agreeable to the scorched surface. It is advisable to apply the dressing on strips rather than on a large sheet, as their removal is easier at the subsequent dressings of the wound.

For burns of the face the lint or linen should be cut in the form of a mask with holes for the eyes, nose, and mouth.

Great care, as we have said, should be taken to avoid breaking the blisters, but it is right to make a hole into the most dependent parts so that the fluid can escape and leave the skin still covering the wound. In this way much pain is avoided, and the raw surfaces are not exposed to the air. It is well not to change the dressings oftener than is absolutely necessary, for the pain this process entails is severe and is trying to the nervous system—a matter of particular consequence in the case of children. It is best to leave the dressings on until they become loosened by the discharge, or are uncomfortable, or smell disagreeably. Plain water should not be used for washing burns, but should have a small quantity of bicarbonate of soda or common salt added to it, together with a few drops of Condy's fluid or other mild antiseptic to remove the smell.

Scalds. Scalds of the mouth and throat may result from children drinking from the spout of a kettle, and occasionally in adults from taking unexpectedly hot fluids. It is accompanied with danger, for there may be rapid swelling of the throat from inflammation, which may obstruct the breathing. Send for the doctor at once, for the operation of tracheotomy may be necessary. In the meanwhile, apply a sponge or flannel wrung out of hot water to the front of the neck, from the chin to the breastbone, and keep the patient quiet and lying down. Ice may be sucked, cold water sipped, or olive oil swallowed in sips, as they all soothe the pain and relieve the swelling.

Fire. One of the greatest emergencies with which we meet in daily life, and one which tries our presence of mind to the utmost, is that of fire. It is therefore of the greatest importance to know the right thing to do and how to do it. A woman whose dress catches fire should immediately lie down on the floor, and anyone who goes to her assistance should instantly make her do this, or, if needful, throw her down and keep her in the horizontal position. Apparently the first impulse that comes over a woman under these critical circumstances is to run about and shriek for help, which more than likely only arrives when irreparable damage is done. It is for this reason that one may have to resort to force in order to get her to do the right thing. The explanation of this line of treatment is, of course, that flames mount upwards, and that if the upright position is maintained they will ascend and burn the body, neck, head and face. If the front of the dress be on fire the person should be placed on her back ; if the back of the dress catches, she should be laid face downwards.

Having laid herself flat down on the floor, she should shout her loudest for assistance and catch at anything that is within reach, such as a tablecloth, rug, or mat, and with it smother the flames. If nothing suitable is within reach, she must try and roll herself to the nearest suitable object, or to the bell or door to summon aid.

If a man goes to the assistance of a burning woman he runs but little risk. He forces her flat on the ground, takes off his coat or seizes some convenient article, and smothers the flames with it, beginning at the head. A woman runs much greater risk in rendering assistance, for her own dress is liable to catch fire, the danger being much increased if the burning person will not lie down.

She should proceed as follows : Taking the first suitable article that offers—such as the tablecloth—she holds it up in front of her, allowing its lowest part to drag along the floor, approaches the patient thus guarded, wraps the cloth around her and forces her on to the ground.

If the sufferer has taken the precaution to lie down the matter is easier ; the rescuer—we will now suppose it to be a man—should approach her *head*, dragging the lower edge of the cloth along the ground, and when quite near her place his feet on the edge and throw it over her body. Then, kneeling down, he uncovers her head and wraps the cloth round her body and limbs, until the flames are entirely subdued. It is necessary to recognise the importance of the protection afforded by keeping the cloth well down on the floor, as it is only in this way that the risk of the rescuer's clothes catching fire can be avoided.

When entering a room full of smoke to rescue a person who is being suffocated, first take a deep breath of fresh air, then tie a handkerchief wetted with water over the nose and mouth and crawl into the room on the hands and knees, keeping the face close to the floor. Having found the patient, drag him out of the room, holding the head low all the time.

Electrical Injuries.

In these days when electricity is employed so widely for traction purposes, accidents are likely to occur, either by coming in contact with an electric cable, a fallen wire, or by stepping on a "live" rail. The sudden shock of a strong current will probably cause unconsciousness, and the first thing to be done is to remove the patient from the current. To do this we must in some way protect ourselves from receiving a shock, for to touch the person without precaution is to receive the electric current through our own bodies. The best insulators are rubber gloves, which are always used by those engaged in electrical work. As these are not likely to be handy in an emergency, use any indiarubber article that is, as tobacco pouches or caps or macintoshes, or insulate yourself by standing on an indiarubber mat or waterproof sheeting. Avoid touching anything that is damp, as water transmits electricity freely. Cover the hands with dry clothing, and stand on dry boards, clothing, hay, straw, bricks, or on glass.

Pull the patient out of danger by catching hold of his coat, and particularly drag away the part of his body in contact with the wire or rail through which the current is flowing.

Having released the person from the current, lay him down, loosen his clothing, and restore his breathing. Artificial respiration may be necessary. Rouse him with cold water or by flicking him with a wet towel. Treat the burns in the usual way (*see* p. 230).

Lightning-stroke.

A severe stroke of lightning usually causes instantaneous death, but slighter strokes occur in which the person receives severe injuries and burns, and becomes unconscious. The breathing must first be restored by artificial respiration, and the shock counteracted by warmth and stimulants. The burns require the ordinary treatment. The ultimate recovery is often only partial, various forms of paralysis being left from injury to the nervous system.

CHAPTER LXIII

BANDAGING

THE TRIANGULAR BANDAGE: "Reef" Knot and "Granny" Knot—Scalp or Head Bandage—Lower Jaw Bandage—Eye Bandage—Arm Slings—Shoulder and Hip Bandages—Chest and Back Bandages—Armpit Bandage—Arm and Hand Bandages—Knee and Foot Bandages. THE ROLLER BANDAGE: Rules for Bandaging—Spiral Bandage—Reversed Spiral—Double-headed Spiral with Reverses—Figure of Eight—Capeline Bandage—Head and Eye Bandages—Stump Bandage—Double Spiral—Spica Bandages—Finger Bandage—Foot, Heel, and Leg Bandages—Many-tailed and Four-tailed Bandages—T-Bandage—Elastic and Plaster-of-Paris Bandages.

BANDAGES are used for many purposes, and their neat and efficient application can only be learnt by much practice. As they are of the greatest value in domestic surgery, and may be required for all sorts of emergencies, it will be necessary to describe them somewhat in detail.

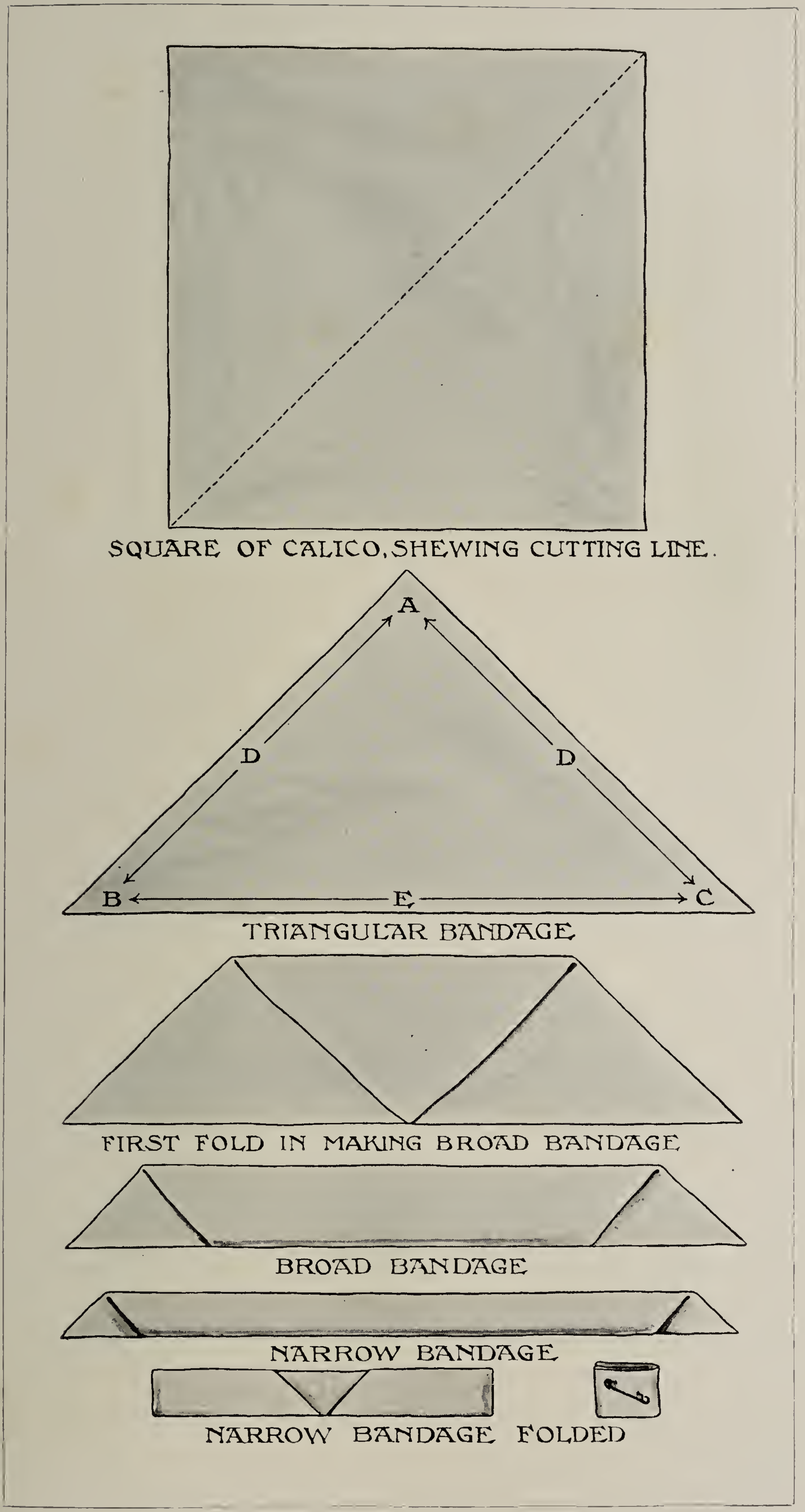
They may be required to fix dressings in place over wounds in all parts of the body; to give support to injured parts; to prevent movement of broken bones and retain splints in position; to apply pressure over wounds or blood vessels to arrest bleeding from them, and for many other purposes.

The two chief varieties are the triangular bandage and the roller.

THE TRIANGULAR BANDAGE

The triangular bandage has been named after Professor Esmarch, of Kiel, who introduced it into the German army, and it has been adopted by the St. John Ambulance Association for general use in their first-aid classes. An illustrated triangular bandage can be obtained upon which there are figures showing all the chief methods of applying it to the various parts of the body, and a similar bandage has been prepared for the classes of the St. Andrews Ambulance Association.

It is particularly convenient for first-aid methods, as it is so easily



SQUARE OF CALICO, SHEWING CUTTING LINE.

TRIANGULAR BANDAGE

FIRST FOLD IN MAKING BROAD BANDAGE

BROAD BANDAGE

NARROW BANDAGE

NARROW BANDAGE FOLDED

TO CUT AND FOLD A TRIANGULAR BANDAGE

made at home, a small bandage being simply the half of a large handkerchief cut diagonally. To make the full-sized bandage, take a piece of calico or linen, from 1 yard to 40 inches square, and divide it diagonally from corner to corner. Or an ordinary handkerchief may be divided in a similar way, and the two pieces stitched together along one of the shorter sides. For children this is unnecessarily large, and a piece of calico 2 feet square cut in half is sufficient and more convenient in use.

Although calico and linen are the most suitable materials for the bandage, they may not be at hand when wanted, and then one has to be improvised from any material that can be obtained. Flannel garments, or silk scarves, a tablecloth, towel, or similar article, may be cut up for the purpose.

In applying the bandage neatness is essential, and it should be put on as smoothly as possible, without creasing or twisting. The various parts of the bandage are named as follow; A is the point, peak, or apex; D, D, the sides; B, C, the ends or tails; and E, the base or lower border.

According to the purpose for which it is required, the bandage may be used unfolded, as when it has to cover a large surface of the body; or it may be folded to various widths when it is desired to apply pressure or fix on a splint. What is termed the "broad" bandage is made by folding it thus: Spread out the bandage on a table, bring the point A down to the middle of the lower border, and then fold it upon itself longitudinally to one-half. The "narrow" bandage is made by folding the broad bandage in half. For most purposes the "narrow" bandage will be found most convenient, since it adapts itself more easily to the inequalities of the part to which it is applied.

For neatness, the bandage should be folded up when out of use, as follows: Fold as a narrow bandage, turn the two ends over to the centre, fold it into four, and fix it with a safety pin. It is thus always ready for use, only requiring to be unfolded to form a narrow bandage. When the bandage has been applied to any part of the body, the ends should be fastened with a safety pin, a few stitches, or a reef knot.

There are two ways in which the bandage may be tied—by a "reef" knot and a "granny." The first is the right way, the second the wrong one, and it is astonishing how easy it is to do the wrong one. The right knot, however, should be learnt by constant practice, and, once mastered, it will be found difficult to tie a knot in any other way.

The first hitch is taken in the same manner in both cases. It is, however, different with the second. The end which is uppermost with the first hitch, when tying the "reef" knot, completes the half circle outside, or in front of the other end. The proper "reef" knot lies quite evenly, with both ends downwards, when finished; but in the case of the "granny" the ends lie in different directions, and this is not only unsightly, but also insecure. There is another way of tying a knot, which provides more security against slipping than even the reef knot. It is by taking a double turn when tying the first hitch, and then completing the process in the same manner as when tying the "reef" knot —this is termed the surgeon's knot. The "reef" knot is, however, generally adopted in ambulance work.

"Reef" knot, "Granny" knot.

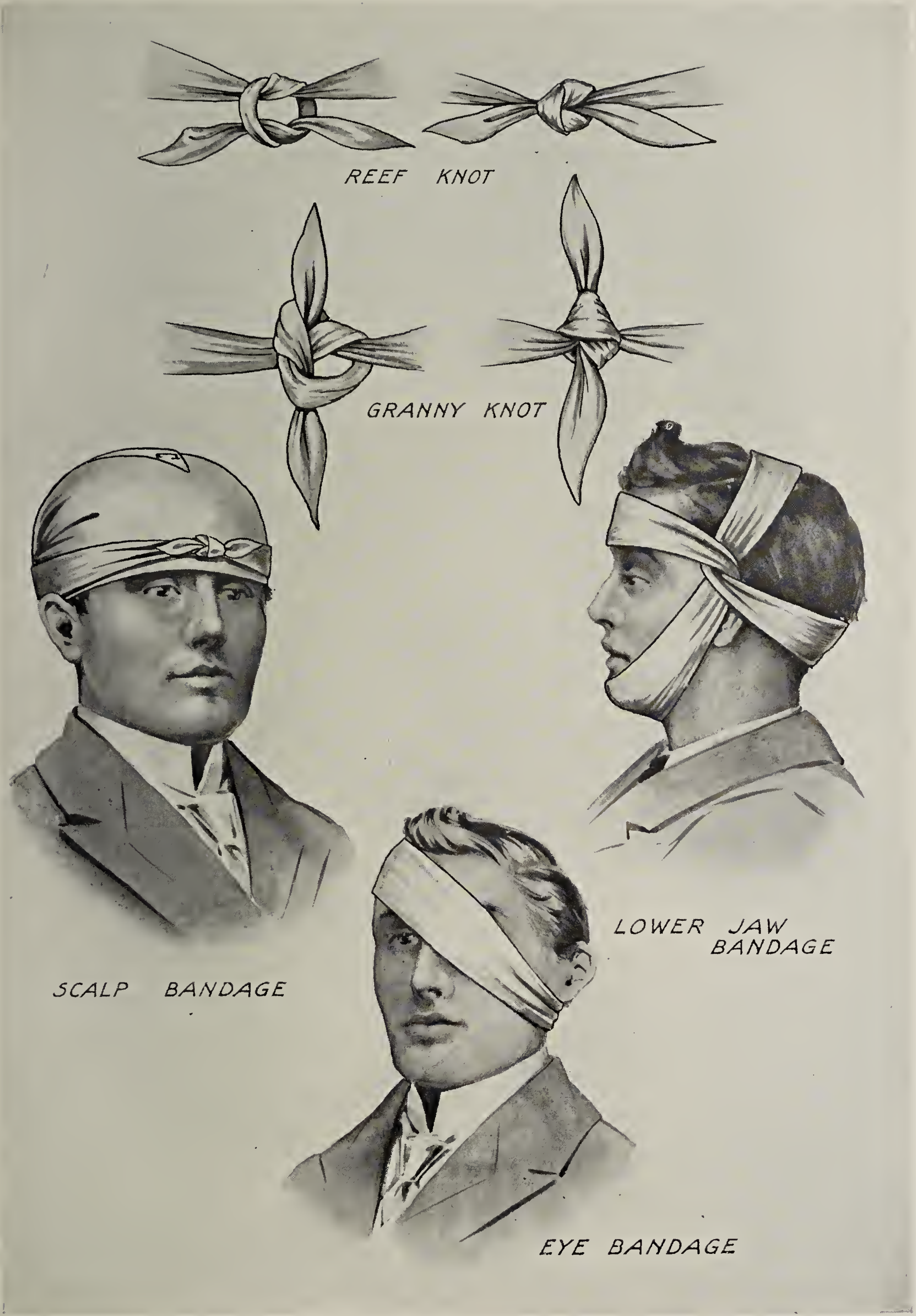
The narrow bandage is the most suitable for tying round splints to keep them in position. It may be applied in various ways; it may be carried round the splint and limb two or three times and then tied, or it may be folded in two and then wrapped round, one of the ends being passed through the loop (which should be placed on the outside of the splint) and then tied securely to the other end by a reef knot.

It is a good principle never to tie the knots against the skin, where they may cause discomfort, but to place them on the outside of the splint, where they are out of harm's way and yet easy to get at.

We will now proceed to show how the triangular bandage may be applied to various parts of the body, according to the purpose for which it is employed, availing ourselves in some instances of the guidance of "First Aid to the Injured," the excellent handbook of the St. John Ambulance Association.

Scalp or Head Bandage.

Having spread out the bandage, fold the lower border or base over, making a hem about 1½ inches deep, and, standing behind the patient, place the centre of this hem in a line with the nose, the fold being outwards, not next to the forehead, meanwhile *keeping it close down to the eyebrows*, with the point of the bandage hanging loosely over the back of the neck. The two ends are then taken up and brought firmly round the head *above*—not over—the ears, and crossed over the point of the bandage, below the prominent (occipital) bone. This will prevent the bandage "riding up." The ends are now continued round to the front and tied in a reef knot over the nose, *close down to the eyebrows* (not high up on the forehead); and



REEF KNOT, GRANNY KNOT, AND SCALP AND FACE BANDAGES.

what remains should be neatly tucked away. The point must be pulled down and brought upwards and over the back of the head, and pinned on the top. It should be firmly fixed and tested by taking hold of the back of the bandage below the occipital bone, and trying to remove it. This bandage is extremely useful for keeping poultices and dressings in position. It is known also as the "shawl cap."

Lower Jaw Bandage.

Fold a "narrow" bandage. Place the centre under and over the chin, and tie it well back at the top of the head, otherwise it will slip off. Or, better still, place the chin in a narrow bandage, as before, and taking the two ends upwards in front of the ears, pass one over the top of the head and twist it with the other, carrying one end round the forehead and the other round the back of the head, below the occipital bone, and knot both over the opposite temple.

Eye Bandage, etc.

Fold a "narrow" bandage. Place the centre over the eye, and, passing it obliquely round the head, tie in a reef knot at the back, in a line with the eye. For any part of the body which is round, fold a "narrow" bandage, place its centre on the wound, carry the ends round the limb, and tie in a reef knot over the wound.

Large Arm Sling.

To form a large arm sling the bandage must be used unfolded. Hold the bandage up in front of the patient's chest with one end over the sound shoulder and the point behind the elbow on the injured side. Bend the arm up across the centre of the bandage against the front of the chest, then put the other end of the bandage over the shoulder of the injured side, carry it round the back of the neck and tie the two ends over the sound shoulder. Finally, bring the point forward and fix it in front with a safety-pin. The front edge of the bandage should come to the end of the little finger, and the hand should be raised higher than the elbow.

Small Arm Sling.

The small arm sling is made with a "broad" bandage. One end is placed over the uninjured shoulder, the other is carried round the arm (which should be bent up against the chest), passing between it and the body, round its outer side, and upwards over the affected shoulder. It should then be carried round the back of the neck and tied in a reef knot on the sound side. The knot must not be at the back of the neck, as it will cause discomfort when lying down. This sling should support the wrist joint.

To apply the shoulder bandage, make a wide hem on the lower border, then lay the bandage over the shoulder with the point up the side of the neck and the centre of the hem at the outer side of the middle of the arm. Gather up the ends and pass them round the arm once or twice; tie on the outside. With a "broad" bandage apply a small arm sling, the end which passes over the affected shoulder crossing the point of the other bandage. The end of the sling being secured in a reef knot over the sound shoulder, the point of the other bandage must be folded over neatly and pinned.

Shoulder Bandage.

Sometimes, instead of putting on a small arm sling, the centre of a narrow bandage is laid over the point of the bandage on the injured shoulder, and one end brought across the chest and passed under the armpit, the other end being taken round the back to meet it, and then the two are tied. The point of the other bandage on the shoulder is turned down over it, and pinned as described above.

Hip Bandage.

Fold a "narrow" bandage, place it round the body above the haunch-bones, and tie it with a reef knot on the same side as the injury; take another bandage, and spread it over the thigh with its point upwards, turn up a hem according to the size of the patient, place its centre on the wound, carry the ends round the thigh, and tie them on the outside close to the base of the bandage; then carry the point up under the waistband, pull it up tightly, turn it down over the knot and pin it.

Chest and Back Bandages.

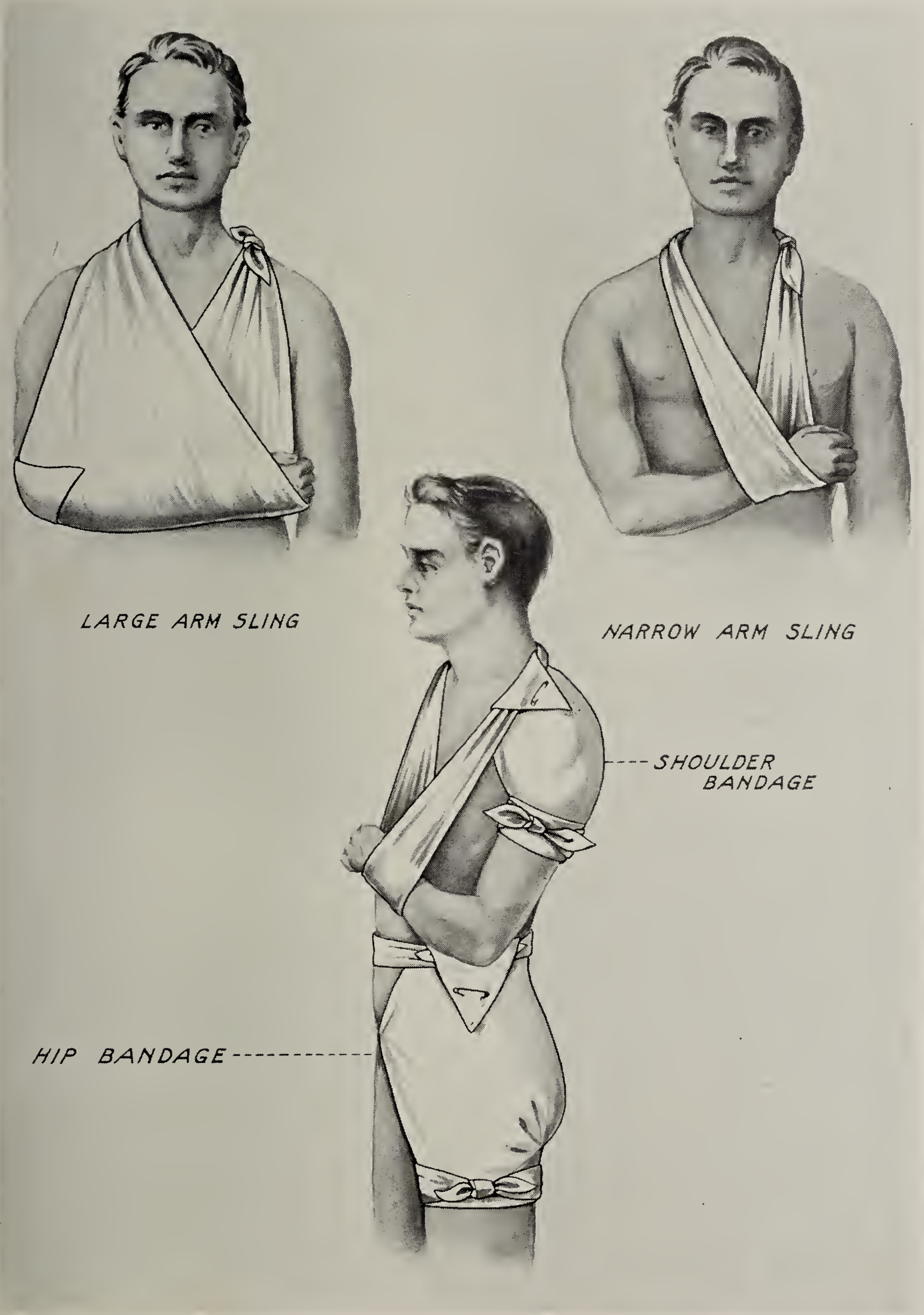
Spread out a bandage and place the point over the shoulder of the affected side; carry the two ends round the waist and tie them, leaving one long; then draw the point over the shoulder and tie to the long end. This bandage is found very useful in keeping in position dressings and poultices applied to the side.

The back bandage is applied in the same manner as the chest bandage, but starts by laying the bandage on the back and tying the knots on the chest.

Armpit Bandage.

Fold the point to the middle of the lower border, place the centre of the bandage under the arm, cross the ends over the shoulder above, and bring them down, one across the chest, the other across the back, to the opposite armpit, and there tie them together.

For the *upper arm* fold a "narrow" bandage and place its centre



LARGE AND NARROW ARM SLINGS, AND SHOULDER AND HIP BANDAGES.

over the injury, carry the ends round the arm, cross them, and bring them to the front and tie in a reef knot. Then bend the arm, and place it in a small arm sling. For the *elbow*, spread out a bandage, fold a narrow hem on the lower border, lay the point on the back of the arm and the middle of the hem below the elbow joint, cross the ends first in front of the elbow, then to the back of the arm again across the bend of the elbow, and tie behind at the back of the forearm. The point may then be brought down and pinned. For the *forearm*, fold a "narrow" bandage, place the centre over the injury, carry the ends round the forearm, cross them and bring them back and tie. Then bend the arm and place in a large arm sling.

Arm Bandages.

Hand Bandage.

Spread out the bandage, place the wrist on the lower border, palm of hand downwards, with the fingers towards the point. Bring the point over the fingers and back of the hand, and lay the point on the lower portion of the forearm. Next, gather up the ends, cross them neatly over the point, pass them round the wrist several times, and tie on the back of the wrist. The point may then be brought down over the knot and pinned. Should the bandage be too large, a hem may be folded along the base or lower border. After bandaging the hand, bend the arm and place it in a large arm sling.

For the palm or back of the hand, fold a "narrow" bandage and place the back of the hand or palm, as the case requires, on the centre of it. Carry the two ends round and cross them, then take them round the wrist twice, and tie.

Knee Bandage.

To bandage the knee-joint take an unfolded bandage, turn up a hem on its lower border, lay it over the knee with the point upwards on the front of the thigh and the centre of the hem just below the knee-cap. Pass the two ends round the leg and cross them over the calf, then carry them upwards, crossing them again above the knee and securing the point. Pass them round the lower part of the thigh, cross behind, carry them forwards and tie in front below the knee-cap. Turn the point down and tie below the knot.

Foot and Sole Bandages.

For the *foot*, spread out a bandage and place the foot on its centre, with the heel near its lower border and the toes towards the point. Draw the point over the instep up to the shin, bring the two ends forward, cross them, carry them round the ankle once or twice, and tie in front. When a splint has to be kept in position on the sole, pass the ends round the foot once or twice, and tie under the sole. The point should in each case be brought down and pinned.

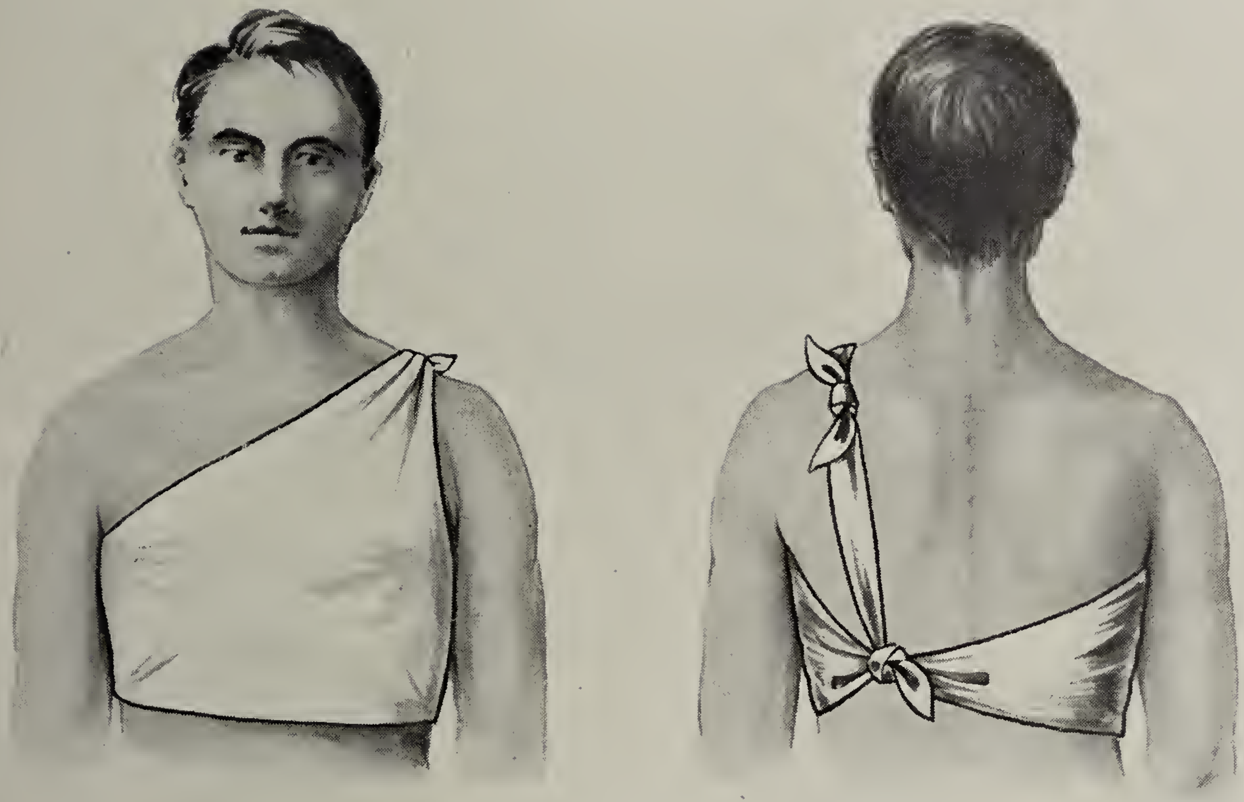
For the *sole*, fold a narrow bandage and place the foot on its centre. Bring the two ends up and cross them over the instep, then take them round the ankle, and tie. Or take them round the ankle, then round the foot, and tie over the wound in the sole.

THE ROLLER BANDAGE

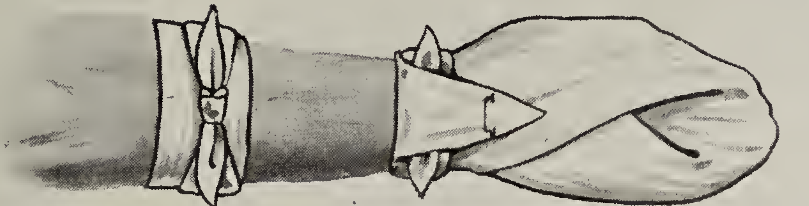
Roller bandages are made of unbleached calico, flannel, domett, muslin, or indiarubber. For home use they can be made of strips of any soft material; an old cotton sheet may be torn up in strips of the requisite width, and two or more may be stitched together if necessary. They must be rolled up evenly and firmly by a regular bandage roller or by hand. The selvedge and loose threads must be trimmed up. In rolling a bandage one end of the strip should be doubled upon itself into a small roll, and, being held between the finger and thumb of both hands, should be rolled tightly up towards the body. The length should be from 6 to 8 yards, and the width should vary according to the part of the body to which they are to be applied. For the head and arm it should be from 2 to 2½ inches, for the leg and foot 3 inches, for the body 6 inches, and for the finger ¾ inch.

Rules for Roller Bandaging

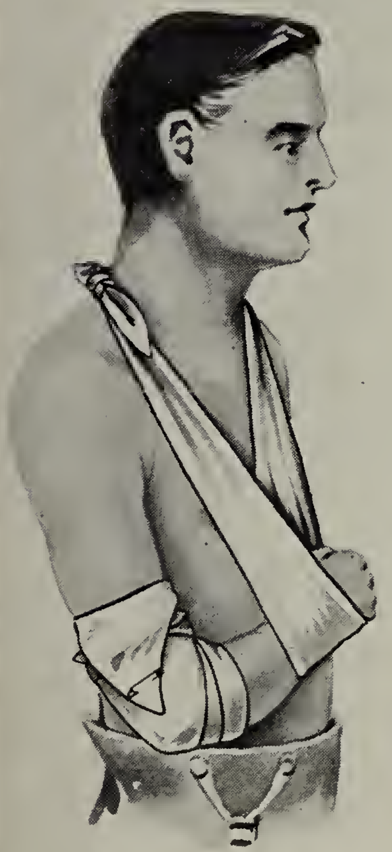
1. Stand in front of the patient.
2. Apply the bandage firmly, with equable pressure to the whole of the part.
3. Hold the bandage securely between the fingers and thumb of the right hand.
4. Fix the bandage first by two or three turns one over the other, applying the outer surface of the roller to the skin.
5. Bandage from below upwards and generally from within outwards over the front of the limb, commencing on the inner side.
6. Let each turn cover two-thirds of the one preceding it.
7. Keep all the margins parallel, and the crossings and reverses in one line.
8. Secure the end with a safety pin or a few stitches. A slack bandage is useless, and an overtight one painful and even dangerous by impeding the circulation; it is a common mistake for beginners in the art of



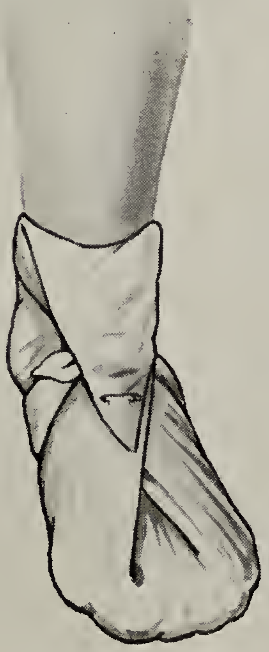
CHEST BANDAGE – FRONT & BACK



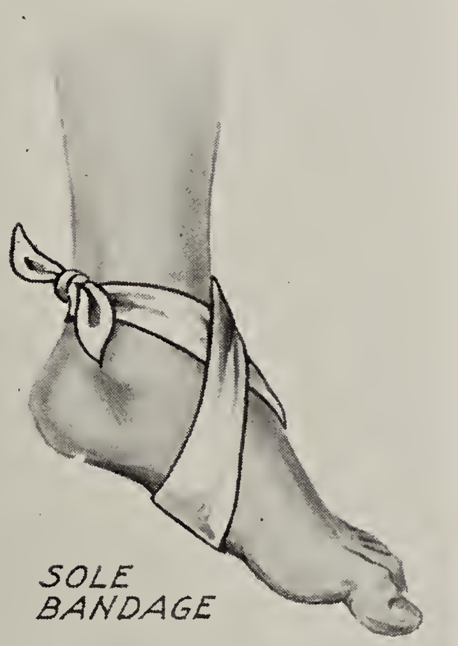
ARM & HAND BANDAGES



ELBOW BANDAGE



FOOT BANDAGE



SOLE BANDAGE

CHEST, ARM AND HAND, ELBOW AND FOOT BANDAGES.

bandaging to apply a bandage too tight in order to avoid wrinkles. It is well in putting on a bandage to unwind only as much as is necessary, keeping the roll close to the body. In taking off one gather each turn up in the hand, rolling it up loosely as it is unwound. A bandage has to be applied in different ways, according to the shape of the part, and a distinctive name is given to each variety. It is usually necessary, however, to combine them in order to make the bandage neat and lie evenly over the whole surface.

Spiral Bandage.

The spiral bandage consists of a series of spiral turns, each overlapping the one below for about two-thirds of its width. Commencing from the inside of the limb, fix the bandage by passing it horizontally round the limb once or twice. Then carry the next turn round at an angle and continue up the limb, keeping each turn parallel with the one below it. This form of bandage can only be applied to a part of uniform girth, or where it increases very gradually, as a finger, or the lower part of the limbs. When the limb increases rapidly in size, the lower edge of the bandage will be loose and gape. To avoid this, the next bandage must be adopted.

Reversed Spiral Bandage.

A "reverse" consists in a turn given to the bandage whereby the opposite side of the bandage is applied to the limb, and the upper and lower edges are changed. It requires a little knack, but is easily learned. Start the bandage by a couple of horizontal turns round the limb, then carry the next obliquely as for the spiral, and when half-way round in the next turn place the thumb of the left hand on the centre of the part applied. Then hold the portion of bandage which is in the right hand loosely and turn it over, so that the bandage will fall into its proper position on itself. It must be then passed round the limb and tightened. This must be repeated at every turn, and the reverses for neatness' sake must be arranged in a direct line, which can be ensured by placing the left thumb in the same position on each turn of bandage. As usual, two-thirds of the bandage must be covered by each succeeding turn. The secret of doing this well consists in having the portion in the hand quite loose, so that by bringing the roller down it naturally falls over. The bandage also should be brought across the limb with a good slope upwards, and the reverse similarly should be brought boldly down, so that the bandage is well doubled over; otherwise, some of the fold will appear on the other side of the limb when the bandage comes round. A common fault is to screw the bandage on its own axis, instead of allowing it to fall over into position, almost of its own accord.

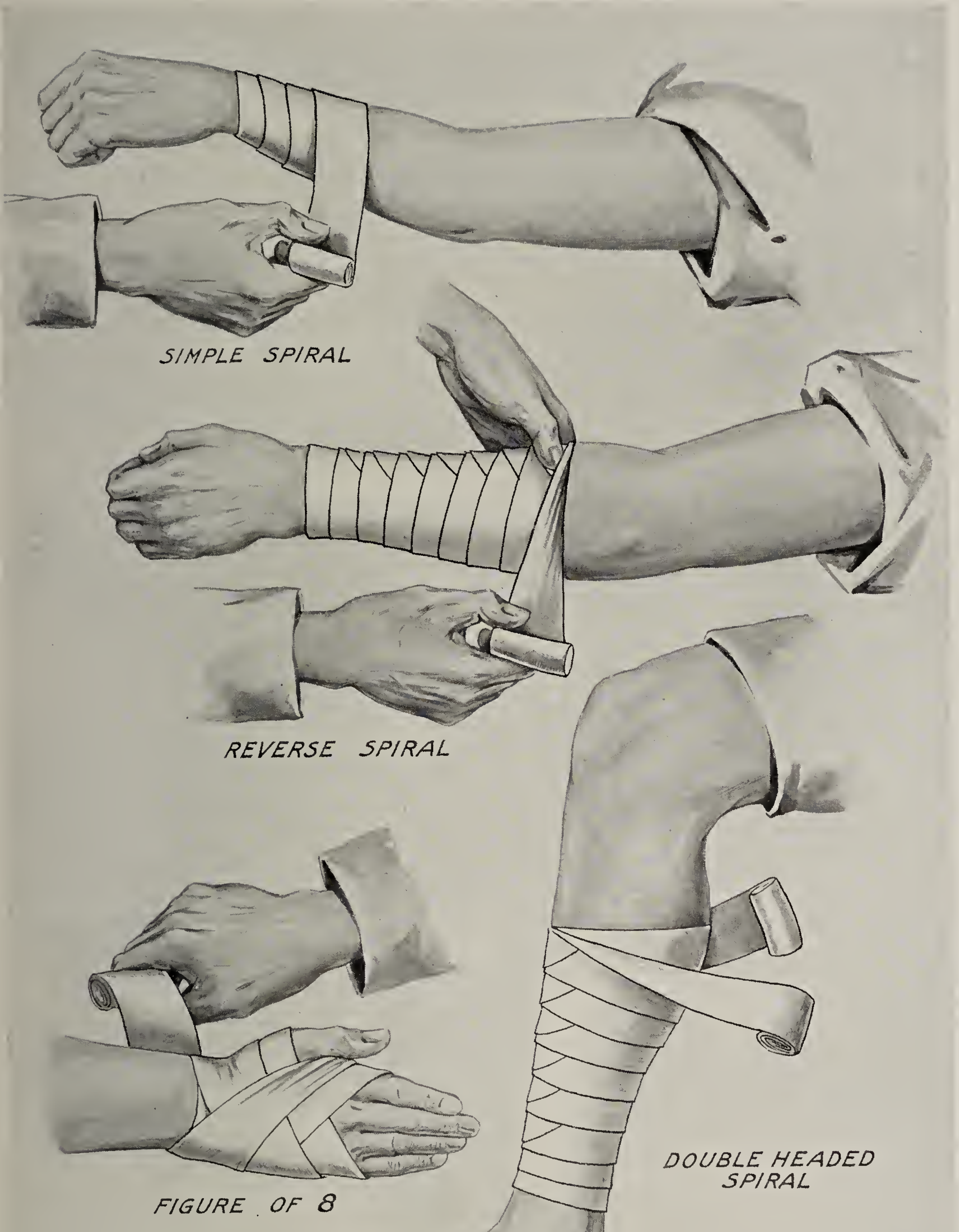
The spiral bandage with reverses is the most used of all the methods of bandaging; it is chiefly employed for the limbs owing to their varying circumference, but it may be used for the trunk or to fasten splints. It is somewhat liable to slip, is inelastic, and is not suitable for the neighbourhood of joints.

Double-headed Spiral with Reverses.

The double-headed spiral with reverses requires a long bandage rolled up from both ends, the two rolls or heads being of unequal size, the larger that which forms the reverses as described below. Take a roll in each hand, and place the centre of the unrolled part of the bandage underneath the lower portion of the limb, bringing the rolls of bandage to the front and changing them both into the other hand. The smaller roll must now be applied as a simple spiral straight up the leg, whilst the larger roll is applied as a reversed spiral, the rolls being carried round the limb alternately, first a simple spiral then a reverse. This method secures great firmness, and the turns are not liable to slip, as each layer of the spiral is firmly fixed by the succeeding layer of the reverse. This bandage requires some practice, but the good result will repay the labour of learning it.

Figure of Eight Bandage.

The figure of eight bandage is at once firm and elastic; it may be applied to all parts, but is especially useful for the limbs, and is the best method for carrying a bandage over a joint. Applied to the length of a limb or over a joint so as to cover it completely, it has much the same appearance as the reversed spiral bandage, but it is applied in an entirely different manner. This bandage must be commenced by taking two turns horizontally round the limb to fix it, passing it from within outwards. The third turn must be carried obliquely up the limb on the outside, round the back, and then down the inside; then pass it round the back of the limb and carry it again in an upward direction over the front of the limb to the outside, round the back and down as before. Repeat this until the limb is covered as far as needed. Each turn must cover the previous one equally, and the edges of the turns must be kept parallel. When it is finished fasten the end with a safety pin.



SPIRAL AND FIGURE-OF-8 BANDAGES.

The figure of eight bandage requires twice as much to cover a limb as with the reversed spiral. In practice it is usual to combine the two methods, so that, for example, if the lower limb has to be bandaged from the foot to the thigh, the following procedure would be adopted : There would first be a turn or two round the foot, then the ankle would be covered with the figure of eight (leaving out the heel), the leg would have the reversed spiral, the knee the figure of eight, and the thigh again the reversed spiral.

This bandage lends itself well to application to a joint, and to cover the points of the elbow, heel, and kneecap. The first turn should be applied over the centre of the joint, and the others should be carried in a series of enlarging figures of eight, above and below the first, which should be left visible. It is important before bandaging a joint that it be placed in the position in which it is to remain.

Capeline Bandage.

For the capeline bandage stand behind the seated patient. Take a double-headed roller bandage, and place the middle of the unrolled portion on the centre of the forehead close to the eyebrows, carry the two ends round the head above the ears, but *well down* at the back; cross the bandages by passing each into the other hand. The bandage which is uppermost, covering the other, should now be carried round the head to the forehead. The under bandage, which is held by the other, should be carried over the top of the head, just to one side of the middle line, to the forehead. It is here met by the other roll which has gone round the head ; the latter should be continued round over the former and fix it. This manœuvre should be repeated, one bandage being carried round the head and securing the other, which goes backwards and forwards over it, first passing to one side of the middle line and then to the other until the whole is covered. One layer of the latter must overlap its neighbour in the ordinary way. When finished, the two ends may be tied in a knot or secured with a safety pin.

This bandage may be applied to the half or the whole head, as desired. It is an attractive-looking bandage when finished, but is not very satisfactory, as it is likely to slip off the top of the head. It is not easy to apply well, is hot, and if tight is painful. It can with advantage be replaced by the " shawl cap " of the triangular bandage (p. 236).

For the head bandage it is [usually sufficient to carry two turns round the forehead (close down to the brows) and back of the head (well below the projecting part), and then, fastening the bandage with a safety pin behind one of the ears, to carry it round the chin and over the top of the head to the other side, somewhat in front of the other ear, where it must be finished off with another safety pin.

Head Bandage.

To cover the eye and retain a dressing over it, the following method should be employed: Commence the bandage at the side of the head opposite the affected eye, bring it forward round the forehead and back of the head, gradually raising it behind, next carry it forward and downward obliquely over the eye and under the ear, then round the back of the head to the original starting point, and finally round the head horizontally; finish off and pin at the side of the head where the bandage began.

Eye Bandages

Bandages to cover the eyes after operations must be light, and one suitable to cover them after the operation for cataract is made of a single straight strip of muslin with tapes attached to tie behind the head.

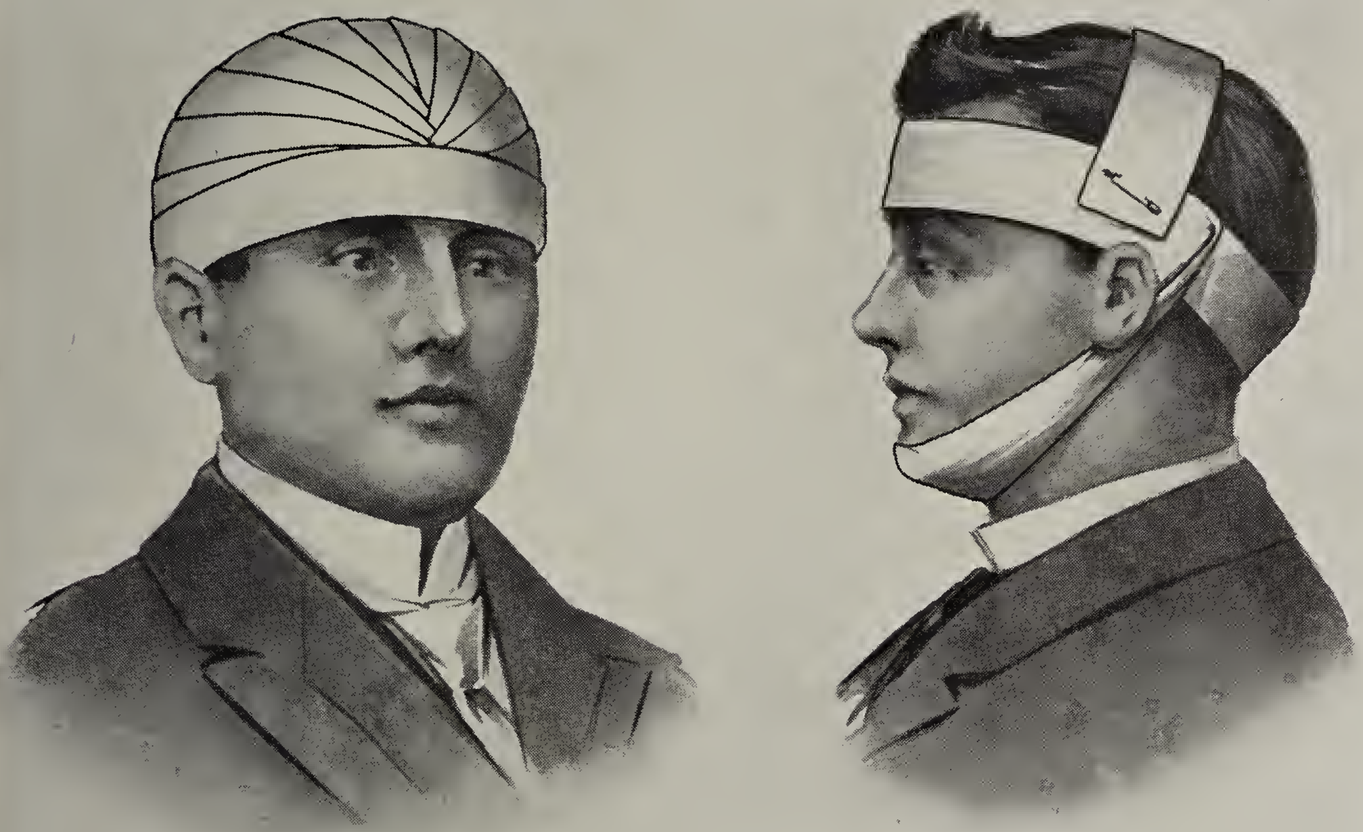
A double-headed roller may be applied to a stump in the form of a capeline (p. 243), or the pattern known as the *recurrent bandage* may be employed. The roller for this should never be more than 2 inches wide. The bandage should first be fixed by one or two circular turns 3 or 4 inches from the end of the stump. The thumb should be placed over the middle of these turns in front and the forefinger behind, and the bandage then brought right over the face of the stump from the middle line in front to the same point behind, and carried backward and forward first to one side of the middle line and then to the other, whilst the finger and thumb firmly hold the reverses or turns on each side of the stump. When the whole stump is covered the bandage is carried once or twice circularly round it, and fixes the reverses in their position when the finger and thumb release them.

Stump Bandage.

A double-headed roller should be taken, its centre part applied to the limb, one or two circular fixing turns taken round it, and the bandages carried up the limb in simple spirals, but in opposite directions. The two spirals will cross each other in front and behind, forming an open bandage, which is convenient to retain dressings in position.

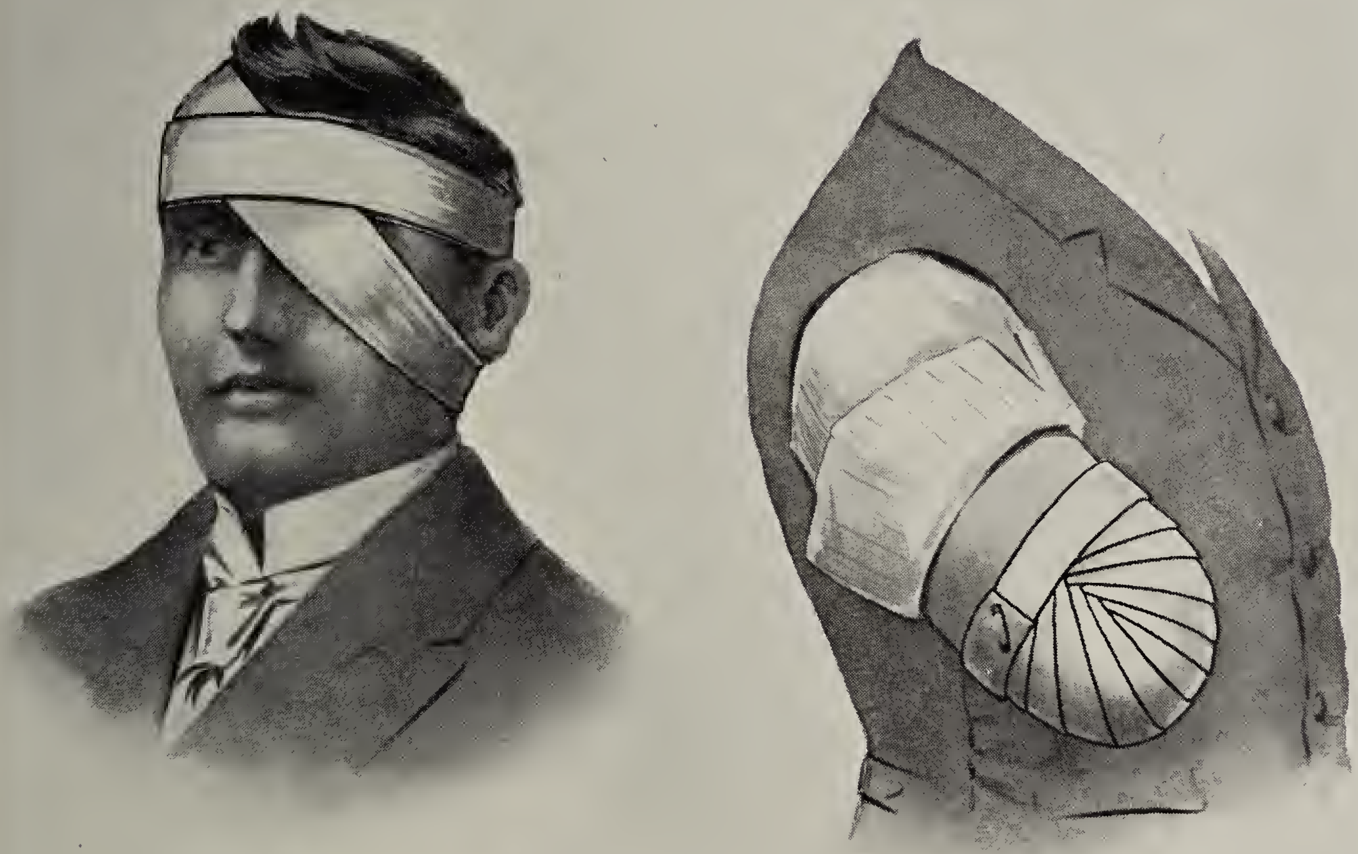
Double Spiral Bandage.

The spica bandage is very useful for applying firm pressure to joints,



CAPELINE BANDAGE

ORDINARY HEAD BANDAGE



EYE BANDAGE

STUMP BANDAGE

CAPELINE, ORDINARY HEAD, EYE, AND STUMP BANDAGES.

for retaining dressings in position, for applications to the groin, or bandaging the breast. It is really a modification of the figure of eight bandage combined with a firm attachment to a limb in the neighbourhood of a joint. Its application to various parts of the body will now be described.

Spica Bandage.

The *shoulder spica* bandage begins by fixing the bandage with two secure turns round the arm as close to the armpit as possible, and passing from within outwards over the front of the arm. The next turn passes out from the armpit and upwards over the highest part of the shoulder that requires covering. It is carried across the back and under the opposite armpit, over the chest and across the shoulder, down and through the armpit, up and over the shoulder and round the back again. This and each succeeding turn must come lower and lower down until the shoulder is covered in.

For the *breast spica* bandage, two turns are to be taken round the waist immediately below the breast in order to secure the bandage; the next turn is carried upwards under the lower portion of the breast and over the opposite shoulder, down the back and straight round the waist again. Continue these turns alternately, one round the waist, the next over the breast and shoulder, each turn being higher on the chest, breast, and waist than the preceding until the part is sufficiently covered. The breast should be gently raised and supported while the bandage is being applied, and it will be found to afford a very useful support to this organ when affected. The two breasts may be supported as follows: Having taken the bandage twice round the waist, bring it across the back, over the shoulder, down under the lower portion of the opposite breast, round the waist, and then carry the same upwards under the lower portion of the other breast, across the opposite shoulder. This must be repeated until the breasts are well supported. Each turn of bandage must be placed a little higher than the preceding one.

For the *groin* or *thigh spica*, begin with two or three turns of the bandage from within outwards round the top of the thigh (reversed spirals or figures of eight give greater security). Pass over the front of the thigh, round the hip, across the back low down and over the opposite haunchbone, downwards obliquely over the lower part of the abdomen, and across the other fold of bandage at the starting point to reach the outer part of the top of thigh. Then carry it round behind, and bring it up from the inner side to start another turn. Each turn must be about 1 inch lower until the thigh is completely covered. The hip should be slightly flexed whilst the bandage is being applied. The point where the bandage crosses may be adapted to the hip, thigh, or groin, according to the part requiring pressure.

The *thumb spica* is often employed for injuries of the thumb joint, and the roller should only be ¾ inch wide. Take two turns round the wrist from within outwards for security, then carry the bandage to the top of the thumb, not direct, but by a simple spiral. Come down gradually, by passing round the thumb and hand on the figure of eight system. That is, take a turn round the top of the thumb, then over the back of the hand, round the wrist, up the inside of the thumb, round it to form a second loop, this movement being repeated round the thumb and hand until the thumb is covered. Make a final turn round the wrist and secure the bandage with a safety pin or a few stitches.

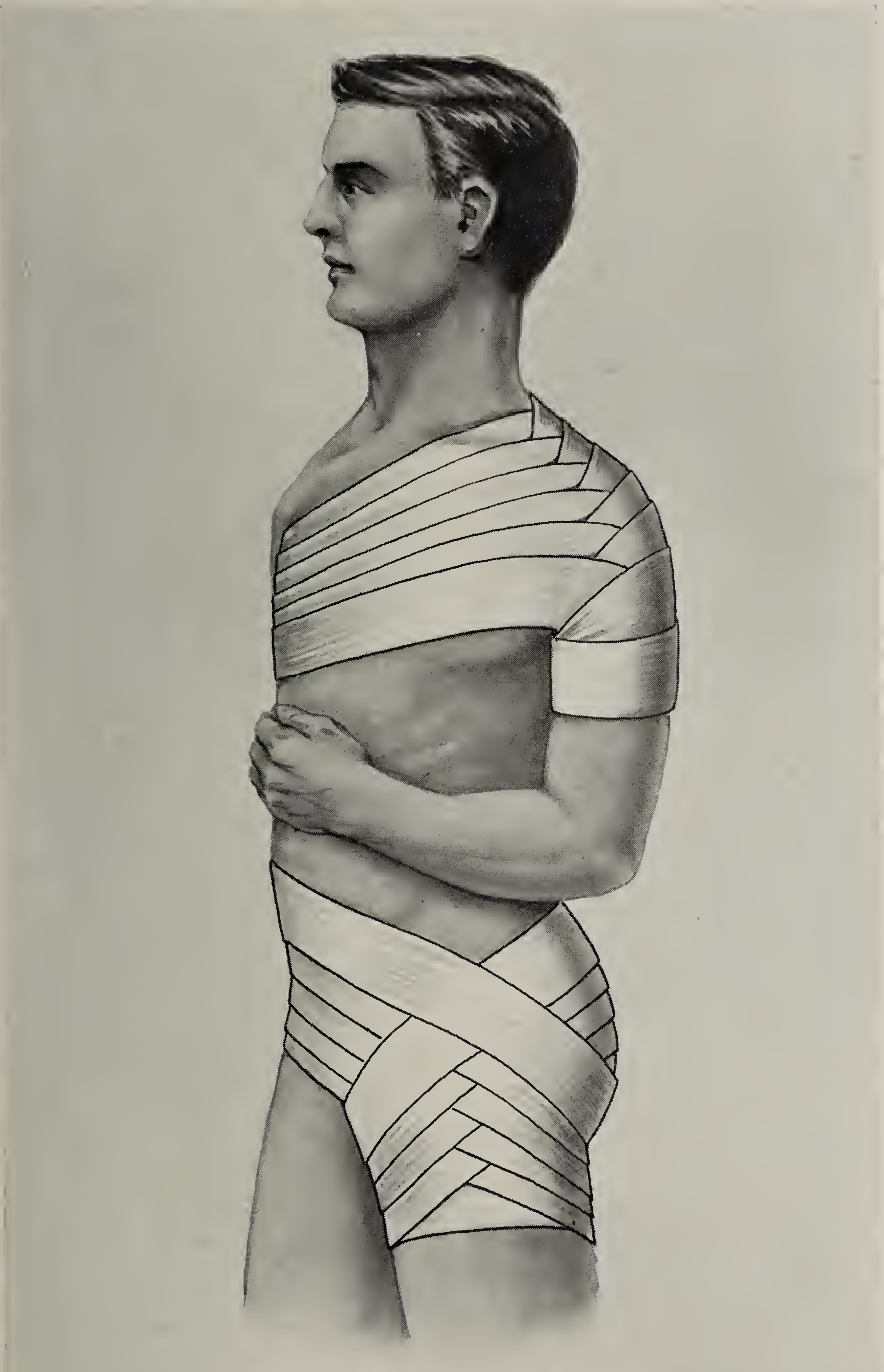
Instead of the figure of eight system a reversed spiral bandage may be used. In this case, having ascended the thumb by a simple spiral, carry the bandage once round near the tip, then cover the thumb with reversed spirals, and complete with a simple turn round the root before carrying the bandage across the back of the hand to the wrist, where it is secured as above.

Finger Bandage.

The finger bandage should be ¾ inch wide. Take it twice round the wrist to secure it. Then carry it over the back of the hand, and by a single simple spiral up to the top of the finger which is to be covered. Now bring the bandage down the finger, completely covering and supporting the same by the simple spiral or figure of eight system, finally bringing the bandage out between the fingers and taking it over the back of the hand and round the wrist. To secure it use a safety pin or a few stitches. All the fingers can be covered by the same means. Commencing round the wrist, proceed to the little finger, and so to all the fingers till they are covered, completing each finger separately and going back to the wrist between each.

Foot and Leg Bandage.

Commence by taking the bandage twice round the foot near the toes, from within outwards. Then apply a figure of eight bandage to the foot and ankle, and a reversed spiral up the leg to the required distance. The heel is not included in this bandage.



SPICA BANDAGES APPLIED TO SHOULDER & THIGH.

SPICA BANDAGES.

The foot, heel, and leg are covered in with a figure of eight bandage, and the bandage is continued up the leg by the reversed spiral system.

Foot, Heel and Leg Bandage. This is the most difficult bandage to apply, and requires much practice to accomplish neatly. Encircle the instep and heel, and commence a figure of eight bandage, gradually widening out until the part is completely covered. Then proceed up the leg by the reversed spiral system.

The elbow, when bent, can be bandaged in the same way.

Many-tailed Bandage. A useful bandage to retain dressings or poultices on the chest, breast, or abdomen is the many-tailed. It is particularly useful when it is important to avoid movement of the patient or of the part to be covered. It consists of a wide piece of calico, flannel, or domett (the width depending upon the part to be covered), which is torn into strips from each side to within 1 or 2 inches of the centre, which is left entire. It may be made also by tearing the material into strips 2 or 3 inches wide and 1½ yards long, then laying them parallel and rather overlapping one another, and stitching them to another strip placed at right angles across their centres. To apply it the tails on one side should be rolled up to the middle and pushed well under the back of the patient, who may be rolled slightly to one side to make room for it. By then rolling him over to his other side the bandage can be drawn through. The dressing or poultice having been placed in position, the tails are carried over it alternately, first from one side and then from the other, overlapping and crossing one another, and when they are all in position they may be fixed with a few safety pins.

Four-tailed Bandage. The four-tailed bandage is made from a strip of roller bandage from 2 to 6 inches wide and from 1 to 1½ yards long (according to its purpose), split in two from each end to within a few inches of the centre. The narrower may be applied to support fractures of the lower jaw. A small piece should be cut out of the centre unsplit part. The chin is placed in this hole, the two lower tails are carried up in front of the ears to the top of the head and tied, leaving long ends. The two top tails are then taken below the ears to the back of the neck and tied, also leaving long ends. These four long ends are tied at the back of the head, the two lower to the two upper. A pad of wool should be placed under the knots to protect the scalp. A wider four-tailed bandage is useful to keep dressings on or give slight support to the knee. Place the centre over the knee-cap, carry the tails round under the knee, cross them so that the lower ones will come forward above the joint and the others below it, tie them in front, two above and two below the knee-cap.

This bandage may be employed to support the breast, the centre being placed under it, the two lower tails being carried one across the chest, the other across the back, and tied over the opposite shoulder, while the two upper tails cross the lower and are tied under the arm.

T-Bandage.

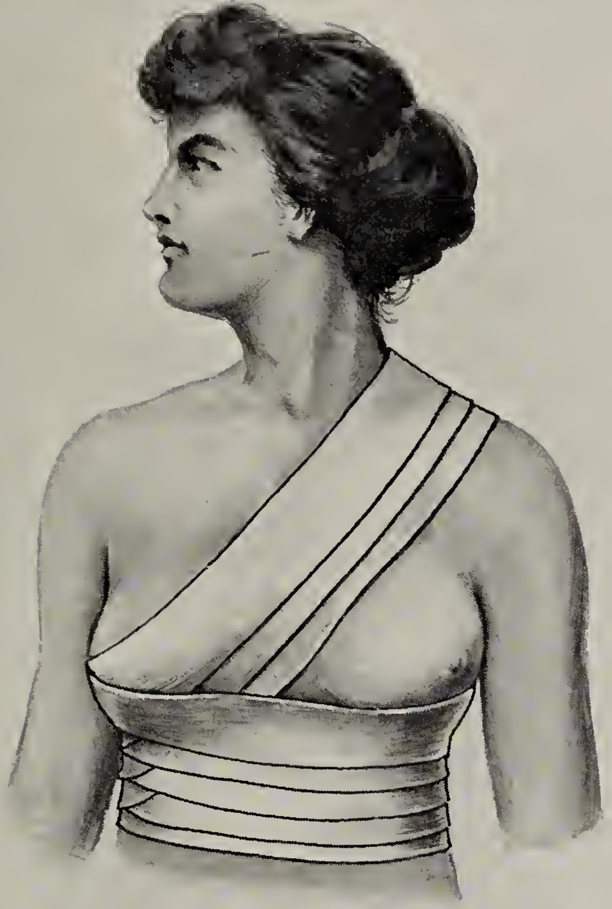
The T-bandage is useful for retaining dressings on the perineum, or after operations in that region. It can be quickly prepared by tying one piece of roller bandage round the body as a waistband; another, fixed to it at the back and passed between the thighs, is carried forward and tied to the waistband in front. This underpiece may be conveniently split towards the end, as it is more easily adjusted.

Elastic Bandages.

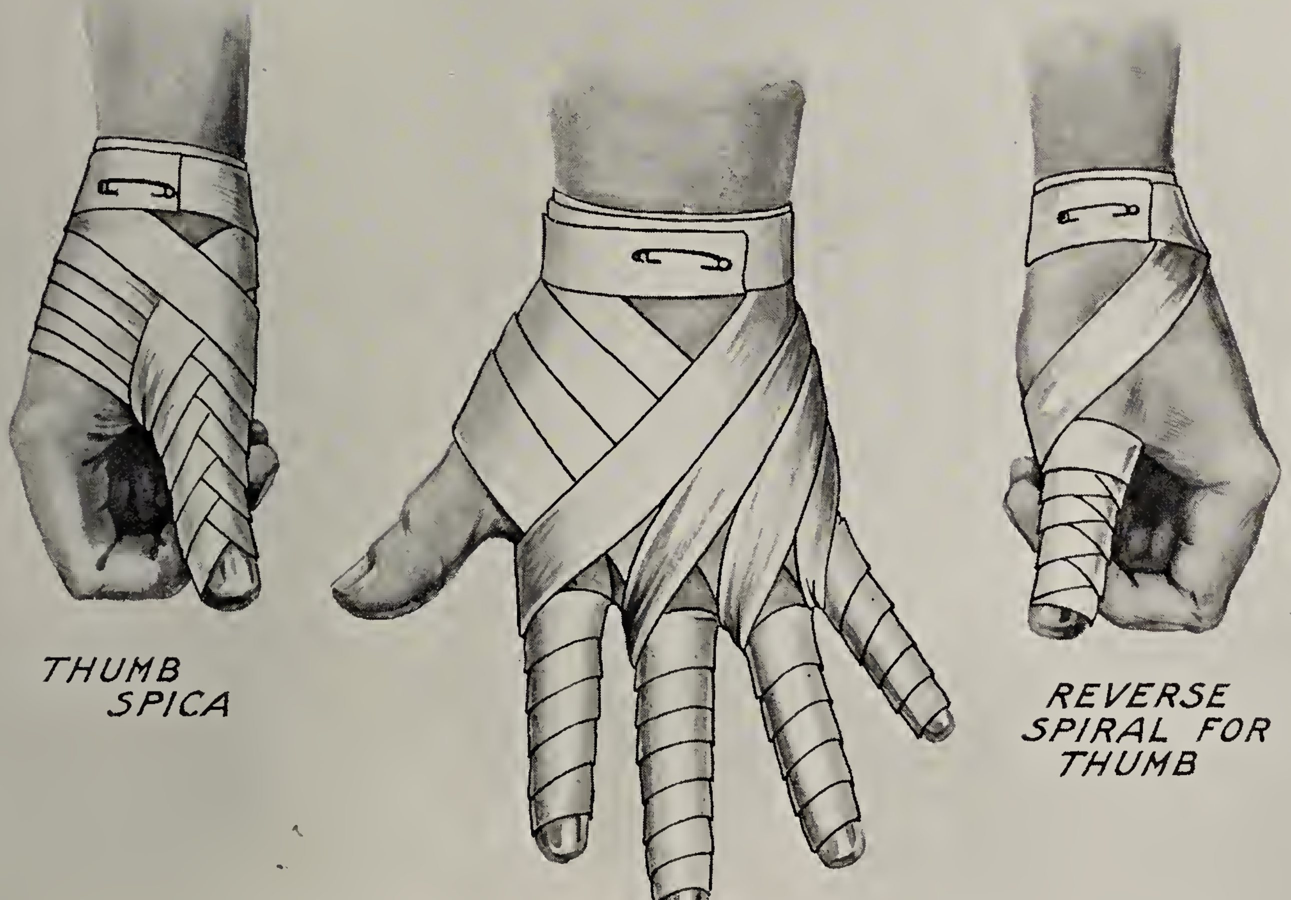
Elastic bandages are made of indiarubber or other elastic material. The best known is Martin's, made of thin indiarubber with tapes attached to one end, by which it can be finished off and fixed. If worn next to the skin, it is liable to set up a good deal of itching and irritation from the development of an eruption. This is due to the interference with perspiration which it causes, and is somewhat lessened when it is perforated with a number of small holes. Another elastic bandage, the crêpe, made of a loose-woven elastic material, is lighter and free from the objections attaching to Martin's, but does not exercise so much pressure. Flannel, domett, silk, and cotton net bandages are elastic in a minor degree.

Elastic bandages are employed to exercise pressure in order to reduce or prevent swelling, and to provide support to the veins of the leg when they are enlarged and varicose. Their application is much more simple than that of the inelastic, for they will lie smoothly if they are merely rolled on in a simple spiral. They require no turns or reverses. They should be rolled up rather loosely before use, and special care is needed to avoid getting them too tight.

When a Martin's bandage is ordered to be used for varicose veins, it should not be worn at night, but taken off when going to bed, thoroughly washed and dried, and applied to the limb before the patient gets out of bed in the morning. It ought not to be applied tightly, but laid on the limb only, otherwise there will be swelling of the parts below the bandage, and pain will be set up.



BREAST SPICA



THUMB SPICA

FINGER BANDAGE

REVERSE SPIRAL FOR THUMB

BREAST, THUMB AND FINGER BANDAGES.

Plaster of Paris Bandages.

Plaster of Paris bandages are usually made of gauze upon which powdered plaster of Paris has been rubbed. Before they are applied the limb should be swathed with a flannel bandage. They should be well soaked in warm water in which some salt has been dissolved, and then put on evenly over the part, special attention being paid to the joints over which they pass, for it is necessary to prevent all movement at these parts. Some powdered plaster of Paris may be wetted and rubbed over the surface to make the whole firm, and to fix the various layers in position. In the course of five or ten minutes the plaster will have set, and should be allowed to dry completely before being covered over. To remove the bandages is a somewhat tiresome job. Occasionally they may be unwound, but when this is impossible some dilute hydrochloric acid will soften them. It should be rubbed along a line on one side, and the bandage can then be divided with a pair of big scissors. Ordinary brown sugar will be found an assistance in getting the hands free from plaster.

These bandages are employed when immobility of a part is required for some time ; they are very useful for fractures after all swelling and pain have disappeared.

A similar apparatus can be made with starch, gum and chalk, glue, or liquid glass.

CHAPTER LXIV

FRACTURES

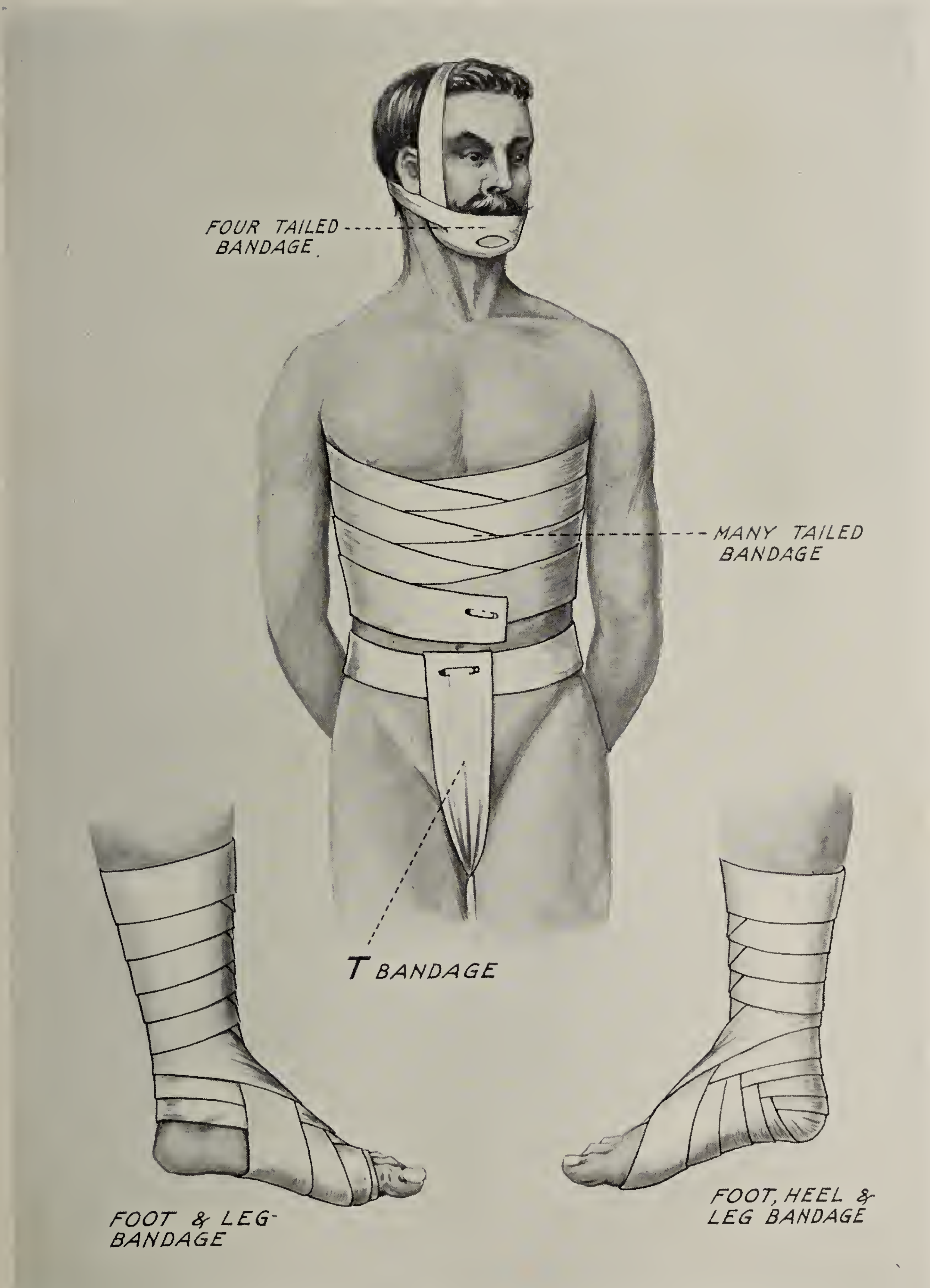
CAUSES: Direct Violence—Indirect Violence—Muscular Action—Varieties—Line of Fracture—How Broken Bone Unites—Union by Callus—Fibrous Union. SIGNS AND SYMPTOMS OF FRACTURE: Pain, Swelling, Loss of Power—Crepitus—Deformity—Increased Mobility. TREATMENT: Splints—Methods of Application.

A FRACTURE is the technical expression for a broken bone. Such injuries are amongst the commonest that meet us in everyday life; it is therefore of great importance that all should be informed of the chief facts concerning them, how they are to be recognised, and the proper way of rendering first aid.

Fractures are almost invariably the result of some local cause, but they are predisposed to by various conditions, some persons being far more liable to them than others, and certain bones and even parts of bones being far more often involved than others. They are frequent in childhood, whilst the bones are soft, and in old age, when they have grown brittle. Men are more liable to them than women, from their greater exposure to injury. The supposition that the bones are more brittle in winter, and hence break more readily than at other seasons, is altogether a mistake, though fractures may be common at this period of the year from falls being more frequent.

Some bones are especially liable to be broken from their occupying exposed situations, such as the nasal bones or the point of the shoulder. The long bones are more easily broken than the short thick ones, the shinbone, for instance, more easily than the heelbone. The portions of bone, again, which have large muscles attached to them are frequently fractured. The bones most commonly fractured are the collarbone, the radius just above the wrist, the thighbone, and the fibula.

The immediate causes of fractures are either external violence or muscular action. External violence may be either direct or indirect.



FOUR-TAILED, MANY-TAILED, T AND OTHER BANDAGES.

Causes: Direct Violence.

Direct violence may take the form of a severe blow on the part, the impact of a bullet, or the crush of a heavy wheel. In this form of accident the fracture is always at the seat of injury, and is often complicated with much damage to the surrounding parts.

Indirect Violence.

In indirect violence the bone breaks at some distance from the point where the force is applied, being snapped, as it were, between the force and the weight of the body. A person jumping from a height on to his feet may break his thighbone, or falling on to his hand may break his collarbone. Fractures received in this way are usually severe, and the parts in the neighbourhood may be torn by the sharp edges of bone.

Muscular Action.

Muscular action is not an infrequent cause of fracture. This is especially the case with the knee-cap, to which the large muscles of the thigh are fixed, a person suddenly setting this muscle in action to prevent himself from falling with the knee-joint somewhat bent may drag this bone into two pieces. Even the bone of the arm (humerus) has been broken in this way by a person striking at but not hitting another; or the collarbone by a rider giving his horse a back-handed blow.

Varieties.

The chief varieties of fractures are the simple, compound, comminuted, and complicated.

A *simple* fracture is one in which the bone is broken in two without any wound of the skin communicating with the fracture, and with but slight injury to surrounding parts.

A *compound* fracture is one in which there is a wound of the skin and flesh whereby air can gain admission to the broken fragments. This wound may be caused by the jagged ends of the bone tearing their way through to the surface, and is often due to the patient making attempts to use the limb, or to rough handling of the parts by inexperienced assistants. It is one of the most serious results of ignorance, which can be entirely avoided in many cases by a knowledge of the principles of how to render first aid to the injured.

A *comminuted* fracture is one in which the bone has been broken into several pieces, or has been crushed up and splintered.

A *complicated* fracture is one in which the surrounding structures have received serious injury. These conditions may be of even greater importance than the broken bone itself. The sharp ends of bone may tear a large blood vessel or nerve; a neighbouring joint may be involved, or some important organ wounded. Examples of the latter complications are injury of the brain in fractured skull, tearing of the lung by a fractured rib or of the bladder in broken pelvis.

Other and minor varieties of fracture are the multiple, greenstick, and impacted.

What may be called a *multiple* fracture is the condition in which a bone is broken in several places, or in which many bones are broken at the same time.

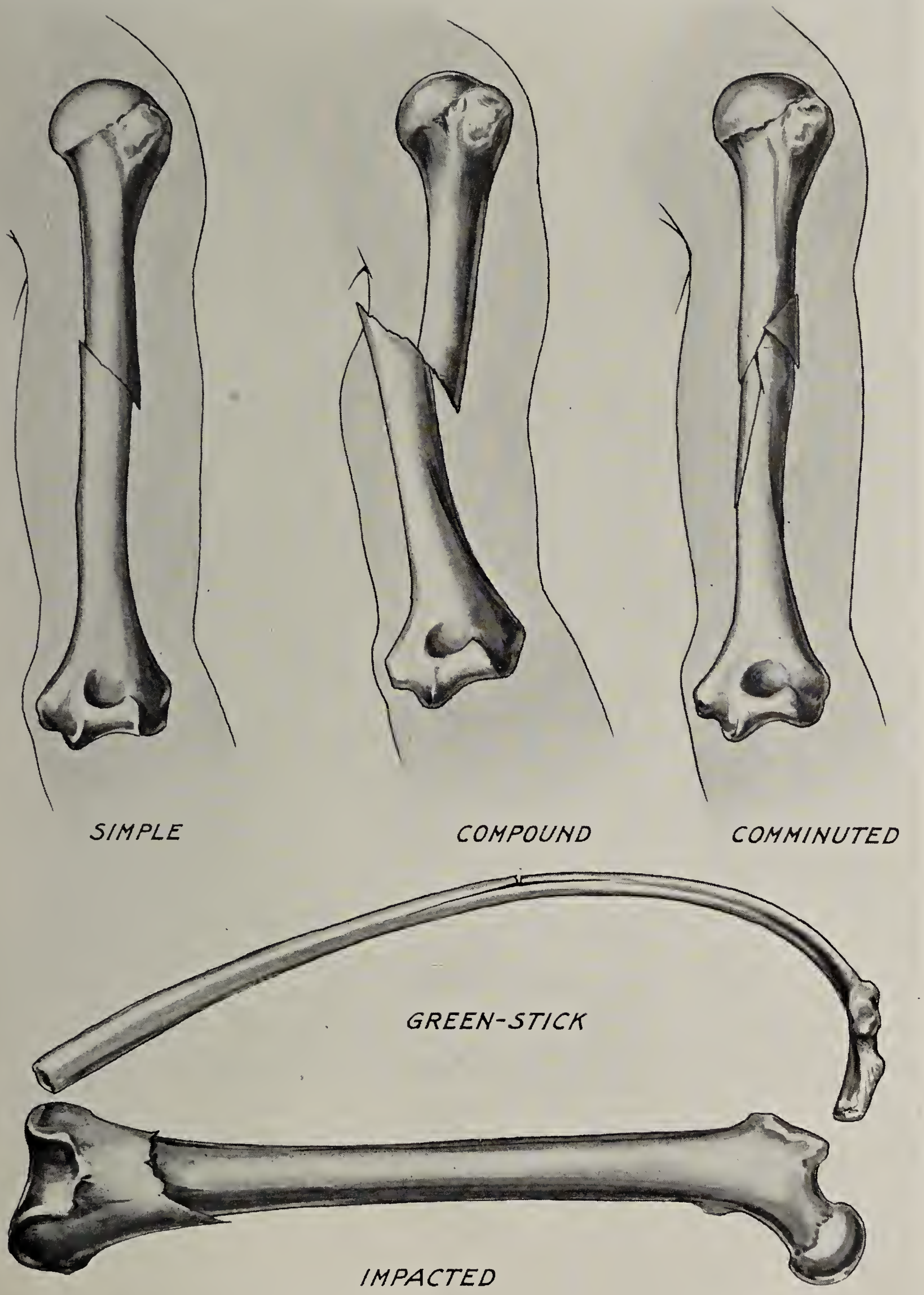
A *greenstick* fracture is only a partial or incomplete break, in which the bone is bent and splintered. It has received its name from the similarity it bears to the breaking of a green stick, and is almost limited to the softened, gristly bones of children, especially those who are rickety.

An *impacted* fracture is one in which one of the broken ends is driven into the other. The bones are then firmly fixed in their false position. This and the greenstick fracture are unattended by some of the most characteristic symptoms of broken bones, a circumstance that adds a good deal to the difficulty of recognising them.

Line of Fracture.

The line of fracture may run in different directions, according to the cause of the injury, and varies to some extent with the particular bone injured. It may run straight across a bone, forming a transverse fracture, as is not uncommonly seen in children in whom the ends of the bones are not firmly united to the shafts. In such instances the injury is really a separation of the epiphysis (see p. 211). These fractures are caused most often by direct violence; they are not attended by much injury to surrounding parts, or by much displacement of the broken ends from one another, and usually heal up quickly and satisfactorily. A transverse fracture is the common form met with in the knee-cap when broken by muscular action.

Again, the fracture may run obliquely along a bone, and may extend a long way. Such an accident is, as a rule, the result of indirect violence. It can be easily understood that with this form the ends of the broken bone are liable to be very sharp and pointed and that the surrounding structures may be pierced and torn, a large blood vessel wounded, or the skin punctured. The broken surfaces can glide on one another, and the resulting deformity is often very marked. Such fractures are principally met with in the bones of elderly people.



TYPES OF FRACTURE.

Thirdly, the bones may be cracked by a blow and the line of the break run longitudinally—that is, along the length of the bone. The deformity caused by such an injury is not great, but there is the danger of the crack running into the neighbouring joint and setting up inflammation in it. A longitudinal fracture is often caused by the blow of a bullet.

How Broken Bone Unites.

It will be of interest to describe how Nature restores a broken bone to its healthy condition, as it will explain the reason for the various measures adopted in the treatment. Immediately after the accident by which the bone is fractured, there is poured out around the broken ends a certain amount of blood, which varies with the nature of the injury and the amount of care shown in its first treatment; the more the movement of the parts, the greater the bleeding. In the course of ten days or a fortnight, this all clears up, but the injury sets up inflammation of the wounded parts, and in consequence a large amount of sticky material, "plastic lymph" (Vol. II., p. 82), is poured out and surrounds the broken bones. This forms a sort of glue, and collects inside the bone (in the marrow cavity) between the broken ends and in the parts around, and forms a sort of sheath to the fracture, thickest opposite the break and tapering off in both directions. In course of time bony particles are deposited in this soft substance, and gradually harden it, forming what is termed "callus." The callus grows harder and firmer, and under the microscope can finally be seen to have all the characters of ordinary bone. If properly treated the hard mass of ensheathing callus gradually disappears, leaving only the part between the broken ends, so that months after a fracture the bone may show but little sign of ever having been broken. Indeed, the seat of a fracture which has well united is often stronger than other parts of the bone.

The aim of treatment is to prevent the excessive formation of callus, and as movement of the broken ends causes its development, it is of the greatest importance to prevent this, apart from the severe suffering which it causes. The larger the separation of the broken fragments, the greater will be the amount of callus, and it is in this respect that a well-set bone differs from a badly-set one. In man, when the fracture has been well set and properly treated, the amount of callus is but limited; in animals, the fracture being often left to Nature, and in some human bones that cannot be kept properly at rest—as the ribs—

a large amount is formed. The portion which surrounds the bones and which finally becomes absorbed is called *provisional* callus, while that which forms between the broken ends and becomes ossified is called *permanent.* The time occupied in the formation of callus and its development into firm bone varies from three to six weeks.

Fibrous Union.

In some cases the broken ends do not unite by bone, but by fibrous tissue. This occurs when the bony surfaces are separated from one another, and cannot be kept in apposition; it is the usual mode of union in fractures of the knee-cap, of the bone at the elbow (olecranon), and in certain other parts.

In compound fractures, in which a wound leads through the skin down to the fracture, the process of union is far more troublesome and prolonged. Matter is very likely to form, the broken ends of bone are often destroyed and have to come away as dead fragments, and altogether the recovery is very protracted. Added to this are the serious dangers of blood poisoning, which before the antiseptic treatment of wounds was introduced were of frequent occurrence. This explains the importance of absolute cleanliness in the treatment of compound fractures, and the necessity for the use of antiseptics, whereby the compound fracture may be rendered practically a simple one by the complete exclusion of all germ life.

SIGNS AND SYMPTOMS OF FRACTURE

1. Pain, swelling, and loss of power.
2. Crepitus or grating.
3. Deformity.
4. Increased mobility at the break.

Pain, etc.

1. The pain of fracture varies much; it may be very severe from the injury to surrounding parts, or it may be almost absent when the limb is kept at rest. The swelling is often extreme, and generally caused by the blood poured out from wounded vessels in the torn muscles. The loss of power is due to the pain, the injury to muscles, and the loss of continuity in the bone. These three symptoms, although present with most fractures, are not in themselves characteristic of the condition, for they may occur with many other injuries when no bone is broken. The three following are, however, characteristic, and when they are all present at the same time, afford conclusive evidence of the existence of fracture.

Crepitus.

2. Crepitus is a peculiar grating, which can be both felt and heard when the rough surfaces of the broken bone are rubbed together by moving the limb. The sensation is one that can never be forgotten when once felt. It can, of course, only occur when the fragments are movable and the rough surfaces in contact. In rendering first aid, if the crepitus is not felt at once and with the gentlest moving of the limb, it is far better to be left in doubt than to continue to torture the patient, and perhaps do serious injury, by rough attempts to elicit this symptom. It is absent in fractures in which the fragments of bone are widely separate, such as a broken knee-cap ; in impacted fractures, in which the bones are jammed together and immovable ; and in greenstick fractures, in which the bones are only partially divided.

Deformity.

3. The presence of some deformity is very general in cases of fracture. The limb lies in some unnatural position, quite impossible in a healthy state ; for instance, if both bones of the leg are broken, the foot by its own weight may fall outwards and lie on its side, whilst the knee-cap still remains in the middle line. The limb also may be appreciably shortened, perhaps be inches shorter than the other. This is due to the broken ends overlapping one another, and in most cases is caused by the contraction of powerful muscles, the support and resistance of the bone being removed. Its existence may be proved by comparing the measurement of the injured and healthy limbs from two fixed points of bone, one above, the other below the injury. Another kind of deformity is the occurrence of a bend or angle in the course of the limb, produced by the broken ends projecting forward under the skin. These three varieties of deformity—namely, twisting, shortening, and "angling"—refer to the long bones : in fractures of the bones of the skull nothing similar can occur ; the broken fragments are then simply driven out of their position and depressed, forming an irregular dent, which can be felt by passing the fingers over the surface.

Another kind of deformity is usually to be found in most fractures. It consists in an enlargement and swelling at the part injured ; it is caused by the over-riding of the bones, and the powerful contraction of the muscles which are injured by the blow, and by the sharp broken edges. Lastly, in those bones which are just under the skin, such as the collarbone, shin, and lower jaw, a distinct irregularity can be felt by running the finger along the length of the bone ; it may be a depression, a lump, or a sharp projection that meets the finger—all three are distinct evidences of fracture.

Increased Mobility.

4. An increased mobility of the limb, which may fall about like a flail, is very characteristic of fracture. This movement occurs at the seat of fracture, a joint being formed where no joint exists; it cannot exist without a fracture. It is recognised at once on handling the limb, and when noticed makes it unnecessary to seek for other signs of fracture. It does not occur in all fractures, being absent in those that are impacted and in greenstick fractures.

Having recognised the presence of a broken bone by the existence of these symptoms, we next proceed to the treatment.

Rest.

The first-aid treatment of fracture consists in rest—rest of the injured part. This first principle must be in our minds in all we do to the wounded limb. Whatever we do, whether it be undressing the patient, examining his injury, washing his wounds, relieving his faintness—in everything we must remember that the broken bone must be kept at rest.

There are many reasons why rest is so important. Movement of the parts may cause the patient much pain; it will irritate the muscles in the neighbourhood of the fracture, setting up in them a painful spasm, which increases the displacement of the bones and exaggerates the injury. It may cause serious mischief by tearing with the sharp, broken edges some large blood-vessel and causing dangerous hæmorrhage; it may also drive the broken end through the skin, and turn a simple fracture into a compound. In doing this we increase enormously the importance of the injury. A simple fracture is not a dangerous accident; it causes no general illness or severe symptoms. A compound fracture is very serious, may entail months of illness, and may be complicated with blood poisoning and end fatally.

To keep the injured parts at rest, therefore, the utmost gentleness must be employed in moving the limb, in taking off the clothes, and in treating the injury. As a rule, if a fracture is recognised—or, indeed, if one is only suspected—it is far better not to attempt to remove the clothing, but use it as a temporary padding for splints, which should be applied at once whilst awaiting the arrival of the doctor.

If there is a bleeding wound, this must be treated without delay, and the clothes must be removed. The greatest gentleness must be exercised in taking off the clothing, and it is far better to sacrifice some article than run any risk of increasing the injury. In taking off the coat, withdraw the uninjured arm first, and then remove the other whilst supporting the injured part. It is a good plan to slit up the seams of the sleeves or legs of garments and tear open the shirt and vest.

Having exposed the wound, arrest the hæmorrhage first by the measures elsewhere described, wash the wound with some antiseptic, and cover it with clean dressings soaked in antiseptic lotions.

Splints.

The next step is to apply some form of splint to secure complete rest and immobility to the fractured bones, and this must be done before moving the patient, wherever he may happen to be, even in the middle of a crowded thoroughfare.

Splints may be improvised from all sorts of articles, and the greatest ingenuity can be shown in making use of whatever objects happen to be at hand in such an emergency. For a broken leg, a walking-stick, umbrella, broom-handle, rifle, or billiard cue ; for a broken arm, a ruler, hammer, policeman's truncheon, or even a long thin book, a thick piece of folded cardboard, straw bottle-covers, cigar-boxes, band-box, roll of newspaper, a bundle of twigs in a cloth, or even the sleeve of a coat well stuffed—anything that is firm and long enough to keep the joints immediately above and below the fractured bone at rest. Some support can be obtained by tying the injured leg to the sound one, tying both legs to a board, or tying the arm to the body.

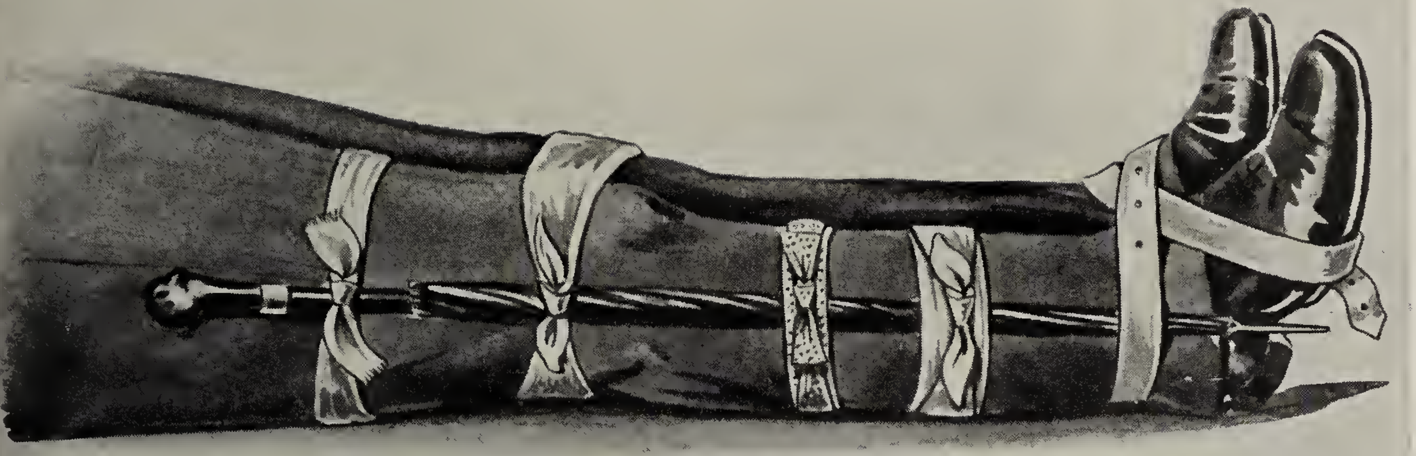
To fix the splints, bandages of some sort are required, and if other bandages are not at hand, they must be made out of handkerchiefs, neckties, belts, braces, bootlaces, string, straps, or strips of torn-up material.

How Splints are applied.

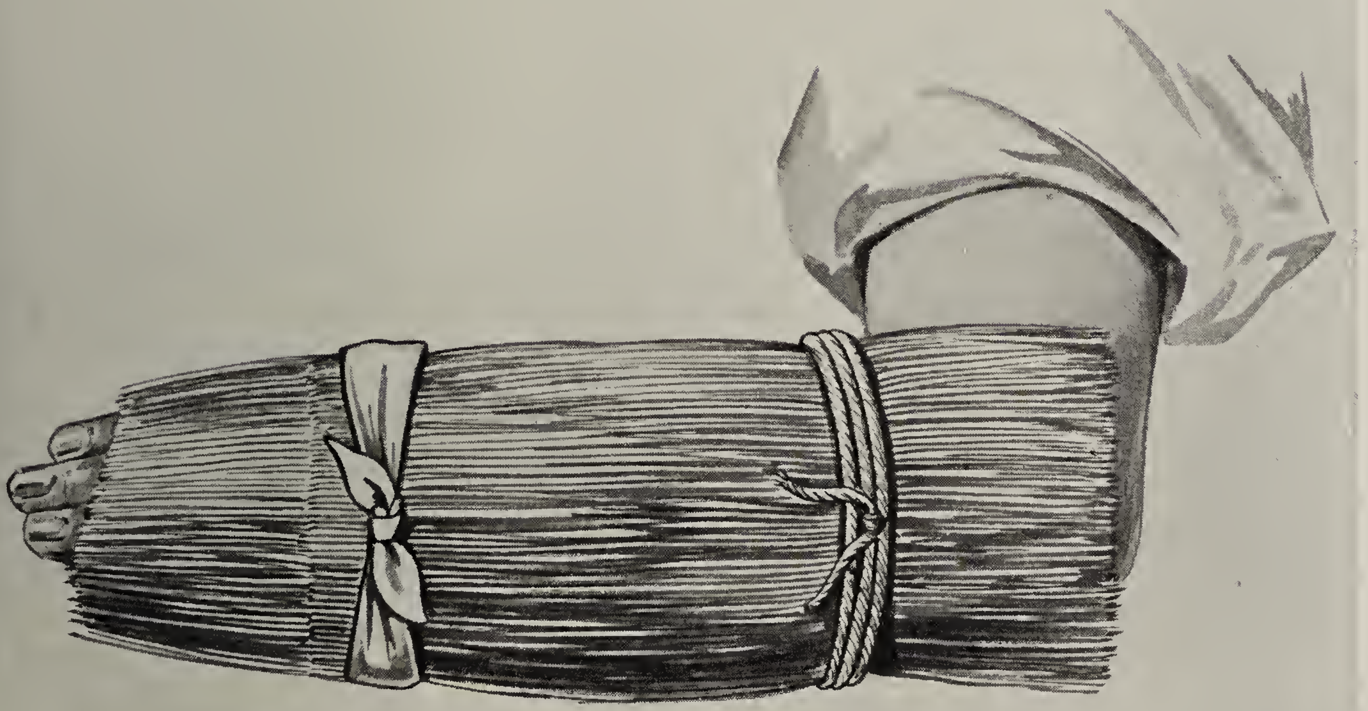
Splints should be long enough to extend beyond the joints above and below the injury ; if the thigh be fractured, the splint should, if possible, reach from the armpit to the ankle. All splints should be padded with some soft material, so as to prevent them from injuring the skin and causing pain. The padding should be placed particularly over any bony prominences, and the clothing makes a very suitable padding for temporary splints. A bandage should be applied above and below the fracture, and at one or two other places so as to prevent the joints from bending, as far as circumstances permit. The knots should be tied on to the outside splint, and the proper method to apply the triangular bandage to splints should be attended to (p. 236).

Having secured the two upper ends of the splints above the fracture, restore the limb to its natural position and appearance by very gently pulling upon it. When doing this, compare the injured limb with the sound one, and then carefully retain it in its position until the other bandages are applied below the injury, and the lower end of the splint is thoroughly secured.

Lastly, do not forget the patient while treating his injury; he is likely to be faint and require a drink of water or some sal-volatile; or he may be suffering from shock, and should be covered up and kept warm.



UMBRELLA APPLIED TO
BROKEN LEG



STRAW BOTTLE COVER
APPLIED TO ARM

IMPROVISED SPLINTS.

CHAPTER LXV

SPECIAL FRACTURES

Fractures of the Skull—Of the Nasal Bones—Of the Lower Jaw—Of the Spine—Of the Ribs—Of the Breastbone—Of the Collarbone—Of the Arms, Hands, Legs, etc.

In the following description of the fractures of the bones in various parts of the body the special symptoms by which they may be recognised are first detailed, and this is followed by an indication of the proper measures to be adopted.

FRACTURE OF THE SKULL

The chief danger of fracture of the bones of the skull is connected with the injury likely to be caused to the substance of the brain. When the brain is violently shaken the patient is stunned and the symptoms of concussion show themselves. If the bones are driven inwards by the force of the blow and compress the brain, unconsciousness will set in *immediately*, whilst if the brain is torn, and bleeding takes place within the skull, it will not develop for some time, perhaps a quarter of an hour, and the loss of consciousness will be gradual and grow deeper as time goes on. Apart from the brain injury, the fracture of the bones will be recognised by different symptoms according to whether the bones of the vault or of the base are broken.

Fracture of the *vault* of the skull is easy to discover when a wound of the scalp is present and exposes the broken bone, for the irregularity of the break can be both felt and seen; it may be a depression, a jagged edge or a loose fragment.

Fracture of the *base* of the skull is beyond reach of sight and touch, and is shown by bleeding from the ears, or from the nose; the blood from the latter may run down into the stomach and be vomited. When the fracture involves the orbit the blood may show after a time as an extensive black eye or a discoloration of the eye-ball. Another symptom of fractured base is the discharge of a clear watery fluid from the ear, which escapes from the cavity of the skull through the crack in the bones containing the ear, and involves a tearing of the drum. It may trickle away in quite a large quantity, and must be looked upon as a serious sign.

Treatment.

Send for a doctor at once. Place the patient in as easy a position as possible with his head slightly raised, loosen all tight clothing round his throat, chest and abdomen, so that his breathing may be unimpeded, and give him plenty of air. If there is a wound on the head, stop the hæmorrhage at once (*see* Hæmorrhage), wash the wound and cover it with a clean dressing. If some convenient means of conveyance is at hand, carry him home in the recumbent position and apply cold to his head, either by a handkerchief wetted with cold water or an ice bag. If he is unconscious, do not attempt to give anything by the mouth, or it may choke him. When at home, place him in a darkened room and keep him absolutely quiet, continue the cold to his head and apply hot bottles to his feet. Complete rest must be continued for a long period after such an injury.

FRACTURE OF THE NASAL BONES

"Broken nose" causes much disfigurement, and must ultimately be placed in the hands of a surgeon, who will restore the bones to the natural shape by passing an instrument into the nostrils.

Treatment.

Wash the wound and cover it with a clean dressing. Check the bleeding from the nose (*see* Epistaxis). The dressing is not easy to keep in position. It will require an ordinary narrow bandage placed round the head and over the eyes, or the double T-bandage, applied thus: The horizontal part is passed round the head covering the upper lip and tied behind, the perpendicular strips are then carried up on each side of the nose, crossed on the bridge and passed over the head and tied to the horizontal piece behind.

FRACTURE OF THE LOWER JAW

This injury is usually the result of direct violence, a blow on the jaw or a fall on the chin. The patient will be unable to speak distinctly or to move the jaw. If the fingers be passed along the jaw, deformity and perhaps grating will be felt, and inside the mouth the teeth will be found irregular. There will probably be bleeding from the mouth from tearing of the gums.

Raise the jaw gently into its natural position and fix it against the upper jaw with a soft handkerchief or narrow triangular bandage, passed under the chin and over the top of the head. This can be made firmer, if the bandage is sufficiently long, by applying it as follows: Place the centre of the bandage to one side of the chin, carry the ends up the side of the head, crossing them just above one ear, and pass the ends round the head, tying them on the side of the head opposite the crossing. Further support is obtained by a second bandage placed over the point of the chin, and its two ends carried round and tied together at the back of the neck, and then tied to the ends of the first bandage. A useful appliance for this injury is the four-tailed bandage.

Treatment.

The patient must not talk, and if any nourishment has to be taken it should be poured slowly into the mouth at the corner.

A more permanent appliance will be required to prevent deformity.

FRACTURE OF THE SPINE

This may occur at any part of the vertebral column, and its symptoms vary according to its position. If it be high up in the neck, paralysis may at once be set up in all the parts below, and death may be instantaneous, but the lower down in the spine the fracture the less severe will be the symptoms. These are due to pressure on the spinal cord from displacement of the vertebræ. The accident may be caused by a heavy weight falling on the head, by the head being bent forcibly backwards, or by falling from a height on to the back across a bar. Under whatever circumstances it may occur, there can be no question of applying splints, and the less done to the patient the better: movement of the body or even of the limbs may be the means of precipitating a fatal issue, which may possibly be avoided by leaving the patient alone until a doctor arrives. The injured person should be placed flat on his back on the ground, with the body as straight as possible. If no medical assistance is within reach, the removal of the patient must be carried out with every possible precaution and gentleness. He must not be raised up or rolled on to his side. A blanket or rug must be gradually passed under him from his head downwards, and if two long poles can be obtained, they may be rolled up in the blanket on each side and used as a stretcher; or a gate or hurdle being placed close beside him, he may be lifted on to it in the blanket, raising him as little as possible from the ground and without in any way altering his position. If he is suffering from collapse, he must receive restoratives, and be given a drink if conscious.

FRACTURE OF THE RIBS

The ribs may be broken either by direct violence, as a kick, blow or fall, or by indirect, as when the front part of the chest is forcibly compressed and squeezed. In the latter injury the bones give way near their middle, and the ends are forced outwards and do not wound the internal organs ; in the former, however, the ends are driven inwards, and the fracture is likely to be complicated by a wound of the lungs, pleura, liver or diaphragm. Any of the ribs may be broken, but those most commonly affected are the middle five, from the fourth to the eighth. The upper escape as they are protected by the collarbone and shoulder, the lower as they are less firmly fixed towards the front. The chief anxiety in this accident is naturally in connection with a wound of the lung, which sets up inflammation of this organ, and may be accompanied with serious illness.

The symptoms of a broken rib are very distinctive: the patient immediately after the accident complains of a stabbing pain in the side, and has a " catch " when he takes at all a deep breath. It is necessary to decide if this be due to bruising merely, or to a fractured rib. If the hand is placed over the painful spot, and the patient takes a breath, crepitus caused by the grating of bony surfaces may be felt, and in the majority of cases it will be found that immediate relief to the pain is afforded by the pressure of the hands. Indeed, the patient soon finds this out for himself and keeps his hand pressed to his injured side, and may even have tied his scarf tightly round his chest. A wound of the lung is shown by a troublesome and very painful cough, with spitting of bright frothy blood.

Treatment.

We must be guided by the patient's experience and firmly bind up the chest with a scarf, towel, or triangular bandages. Two of the latter should be folded broad, passed round the chest with their centres over the injured side and their overlapping edges at the seat of fracture. They should be tied firmly on the opposite side. If bandages cannot be obtained, tighten up the waistcoat and fix it firmly with some pins. If the pressure increases the pain, if the ribs are broken on both sides of the chest, or if there are signs of injury to the lung, do not bandage the chest. It is better then to keep the patient lying down and quiet. The bloodspitting may be relieved by ice to the side, and pieces of ice to suck, or sips of cold water. The arm on the injured side may be supported with a large arm sling.

A patient with broken ribs, when his pain is relieved by a tight bandage, may be able to get home without suffering, but he should be cautioned against exertion, for anything that makes him breathe deeply is sure to aggravate his pain. The best treatment after reaching home is to have the injured side of the chest firmly strapped by strips of adhesive plaster (Vol. I., p. 295), as this limits the movements of the ribs far more than the tightened bandage.

FRACTURE OF THE BREASTBONE

This is a rare accident, requiring a severe, direct blow. The bone being just under the skin, it is easy to recognise a fracture by passing the fingers along it. It must be treated in a similar way to broken ribs, namely, with a firm bandage or by plaster.

FRACTURE OF THE COLLARBONE

The clavicle or collarbone is more frequently broken than any other bone in the body, first because it is exposed to direct violence, secondly because it receives all shocks received on the shoulder and transmitted from the hand and arm. It is usually broken by indirect violence, such as falls on the shoulder and hand, and were it not for its shape, which gives it elasticity, it would be fractured far more often. It is occasionally broken by muscular action, as in giving a back-handed blow. Infants and young children are very liable to this injury from falls, such as tumbling out of bed, and the accident is often overlooked until attention is drawn to the part by the child's crying whenever the arm is moved ; it is then found that a lump has formed about the middle of the bone from the large amount of callus poured out.

The symptoms are usually well marked. First of all, the attitude assumed by the patient is remarkable. He sits or stands with his head bent down towards the affected shoulder, and his face turned away from it, nursing the arm and elbow with his sound hand. In this way he pushes up and supports the shoulder, which would otherwise droop. When the finger is passed along the injured bone the fracture ends can generally be felt to overlap, and perhaps grating may be discovered on moving the arm. The shoulder is flattened and the arm cannot be raised above the shoulder.

First remove the clothing. Take off the sleeve from the uninjured arm first, and then the other with the greatest care, supporting the injured part during the process. In applying bandages the indications that have to be kept in mind are that the shoulder must be well pushed up, the arm must be fastened to the side with the elbow behind a vertical line dropped from the point of the shoulder, and the shoulder-joint must be forced away from the chest by a pad placed in the armpit.

Treatment.

To secure these objects, first place a pad about the size of the fist in the armpit of the injured side. Then bend up the forearm, cross it over the chest with the palm of the hand turned towards the chest and the point of the elbow held well back. Next support the arm in a large sling applied as follows: Spread out a triangular bandage, put one end over the uninjured shoulder, let the other hang down in front of the chest; carry the point behind the elbow of the injured arm; then carry the second end beneath the armpit of the injured side under the pad, and tie the ends behind over the uninjured shoulder. Finally, fold a broad bandage and fix the injured arm to the side of the body by applying it immediately over and upon the elbow; carry the ends horizontally round the chest so as to lever out the arm at the shoulder-joint, the pad forming the fulcrum.

An alternative sling, recommended in "First Aid to the Injured," is put on thus: Bend the forearm up on the chest as before, place one end of the bandage on the shoulder of the uninjured side, keeping the point towards the injured side; pass the lower border between the bent forearm and the body, then under the armpit and across the back, and tie the two ends on the shoulder of the sound side. The point and part of the sides of the bandage must next be folded to support the elbow and fixed with pins. The bandage round the body is then to be applied as described.

It may be that only one bandage is available. In that case, having padded the armpit, bend up the arm on the chest, and apply a narrow bandage above the elbow, one end being brought across the front of the chest, while the other is carried behind the arm and brought forward between the limb and the body; now pass it so as to embrace the portion on the front of the chest and carry it round the back; pull tight, and finally tie off below the armpit on the sound side. This method also is described in "First Aid to the Injured."

If no bandages are at hand two towels may be employed. Place a pad of the usual size in the armpit, cross the forearm over the chest with the hand pointing to the opposite shoulder and the elbow held well back. A towel is then folded as a broad scarf, the elbow is settled into the middle of it, and then, by tying the ends over the opposite shoulder, the hand and forearm being covered by the scarf, the arm on the injured side can be pushed well up. The other towel is then brought round so as to fasten the arm, forearm and hand firmly to the trunk, and the ends are knotted or pinned beneath the opposite armpit.

These methods of first aid are sufficient to prevent any additional damage being done, and enable the patient to travel for some distance and reach his home without risk.

FRACTURES ABOUT THE SHOULDER-JOINT AND SHOULDER-BLADE

Fracture of one of the many bony prominences is not uncommon as the result of a severe blow on the point of the shoulder. It is hardly possible for any but a trained hand to distinguish these from one another. There is but little displacement or increased movement of the fragments to be made out, and the symptoms are such that bruising of the joint alone may produce them. The arm hangs as a dead weight by the side, and the patient, feeling as if it was dropping off, supports it with the other hand ; it is impossible for him to raise the arm. Sometimes by moving the shoulder-joint grating is felt.

The treatment consists in the application of a large arm sling, which raises the shoulder, supports the arm, and prevents movement. Cold lotions or wet rags should be put on the shoulder.

Fracture of the shoulder-blade seldom occurs except as the result of very severe violence whereby the ribs also are broken and other serious injuries sustained. The clothing must be removed and a broad, triangular bandage tied round the chest, over the injury and close up to the armpit. The arm is then supported in a large sling and all movement avoided.

FRACTURE OF THE ARMBONE

This bone may be broken close up to the shoulder, and the symptoms and treatment are those just described for fractures about the shoulder-joint. If it is possible to discover that the humerus itself is broken high up, a broad bandage should be bound over the injury and round the arm and body, the tie being under the opposite armpit. The arm should be supported in a *narrow* sling.

Fractures in the centre of the humerus are easy to recognise: the arm hangs helpless, grating is distinct, the limb is shortened between the shoulder and elbow, and the other ordinary signs of fracture are present.

First bend the forearm up to a right angle, and then apply four narrow splints to the four sides of the arm, long enough to reach from the shoulder to the elbow. These may be made of pieces of firewood, cardboard, folded newspapers, or book-covers, and may be fixed outside the sleeve. The inner and outer splints are the most important, and should be made of the firmer material, and care must be taken that that on the inside is not long enough to impede the circulation at the elbow. They should be held in position by two narrow triangular bandages, one round the upper end above the fracture, the other below. Then support the hand and wrist in a narrow arm sling. (The narrow sling is employed in order to use the weight of the forearm to prevent the overlapping of the fragments.)

FRACTURES ABOUT THE ELBOW-JOINT

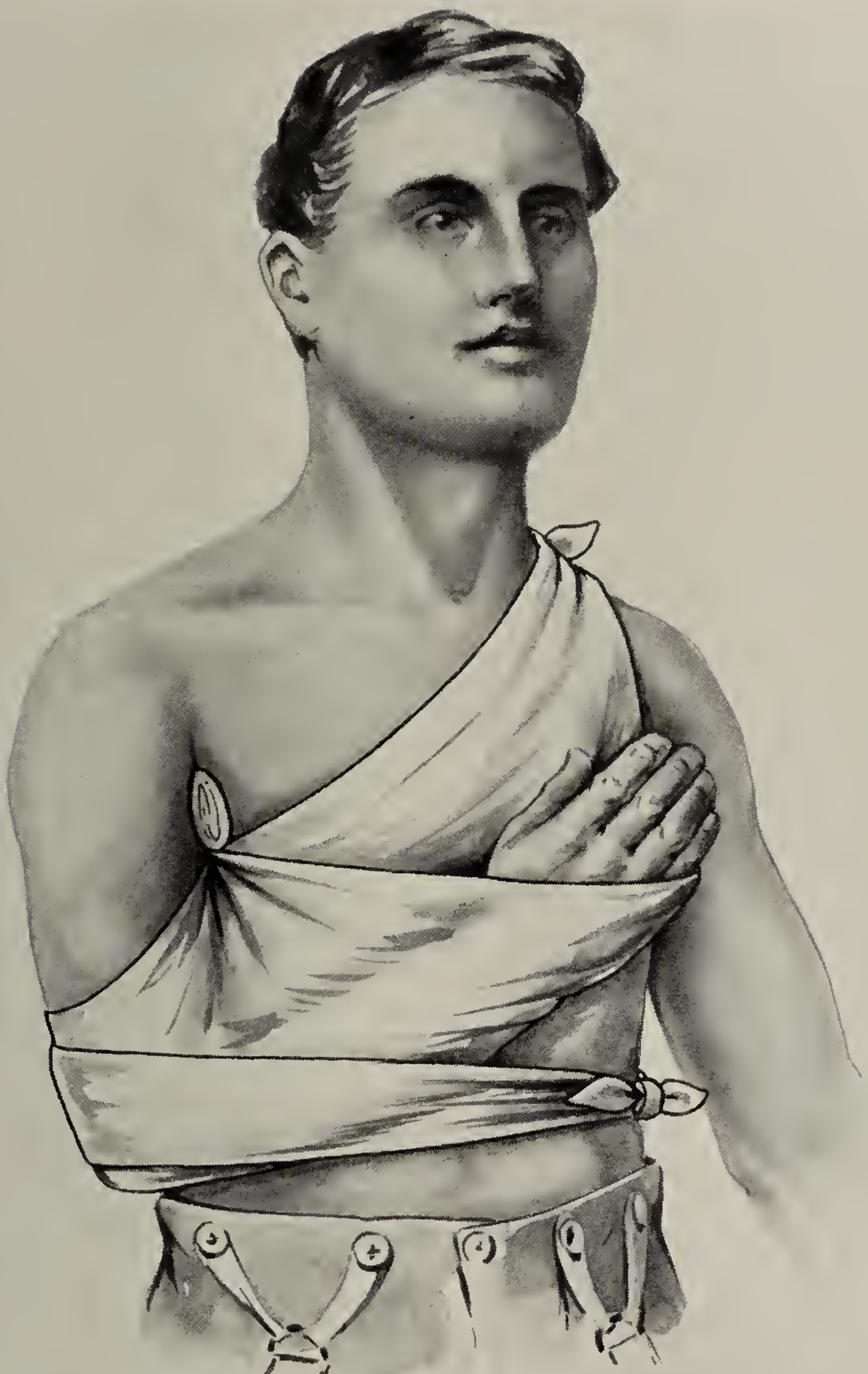
These fractures are often complicated by dislocation of the joint, and are attended with much swelling, which makes it difficult to recognise the exact nature of the injury. It is far better to support the arm in a large sling in the bent position than to attempt to treat the fracture. If the patient is at home he should lie down and rest his arm on a pillow whilst cold water or ice is applied to the injured part.

The bone forming the tip of the elbow (olecranon) may be broken either by a fall or a blow on it, or by muscular action. It should be treated with a splint along the front of the arm, which keeps the limb almost, but not quite, straight.

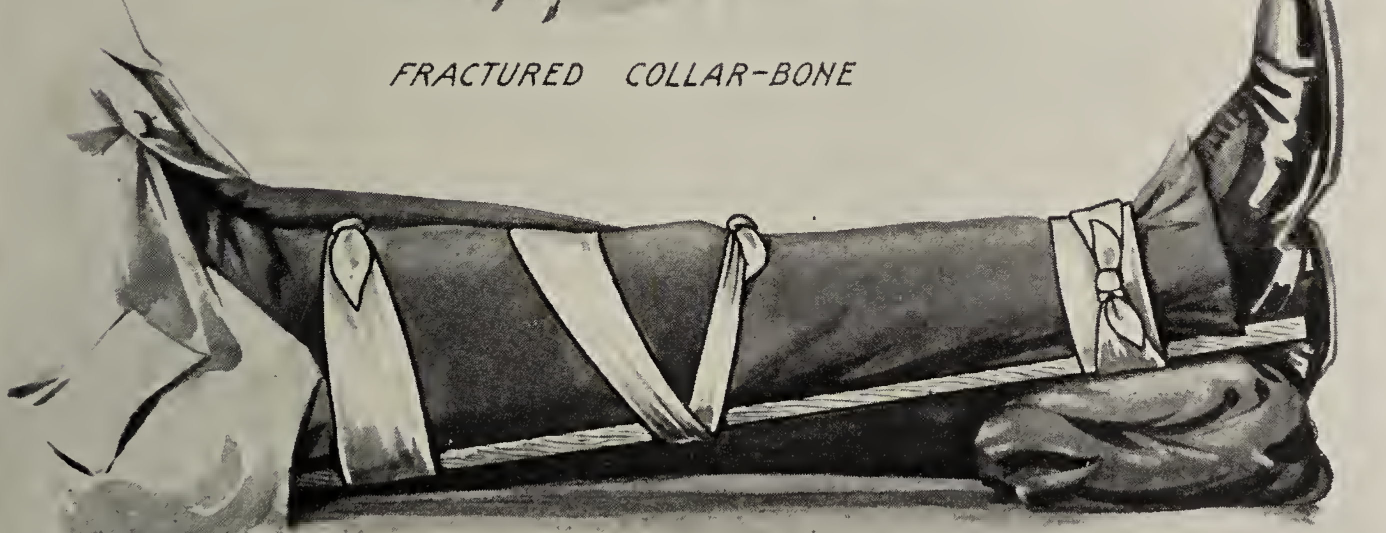
FRACTURES OF THE BONES OF THE FOREARM

One or both bones may be broken, and the symptoms vary accordingly. If both are broken, there are the usual signs of fracture, but when one only is broken these are modified, for the uninjured bone acts as a sort of natural splint and prevents displacement. If the fracture cannot be felt, a little gentle pressure of the two bones together will cause pain at the broken point, and perhaps will produce grating.

The limb should be supported by two splints placed along the front



FRACTURED COLLAR-BONE



FRACTURED KNEE-CAP

SLING FOR FRACTURED COLLARBONE, AND
SPLINT FOR FRACTURED KNEE-CAP

and back of the hand and forearm, and reaching from the elbow to the tips of the fingers in front (without compressing the artery at the elbow) and from the elbow to the wrist at the back. The forearm must be bent up across the chest with the palm turned inwards and the hand raised above the elbow. The splints should be secured by bandages above and below the fracture, and the arm should be well supported in a large sling. A very useful splint may be formed with the tail of a frock- or long overcoat if the patient happens to be wearing one. The front end of the tail should be turned up to the shoulder and there pinned with some safety-pins.

FRACTURE AT THE WRIST

This is a very common injury, and is usually the result of falls on the outstretched hand. There is but little risk from movement of the fragments, for they are usually impacted ; but there is much deformity, the back of the wrist showing a well-marked prominence and the front a corresponding hollow. A large sling is all that is necessary, but sometimes, if there is much pain, a soft splint along the front of the hand and forearm may be tied on lightly. This fracture should be set by a surgeon as soon as possible, as much deformity often follows it.

There are several varieties of fracture which occur about the wrist-joint, one of the commonest being called Colles' fracture, but they should all receive the same first-aid treatment.

FRACTURE OF THE HAND AND FINGERS

If the bones in the palm or several fingers are broken, a straight splint about three or four inches wide, and at least a foot long, should be covered with some soft material and placed on the palm and front of the arm. The bandages should fix it above the wrist and round the hand, and the whole should then be supported in a large arm sling. If only a single finger is affected, a narrow splint should be applied along its palm surface and kept in position by a narrow strip of linen or piece of tape, and the hand put in a large sling.

FRACTURE OF THE HAUNCHBONE

This is the result, as a rule, of great violence : a fall from a height, the passage of a heavy weight, as the wheels of a waggon, over the body, or crushing between the buffers of railway carriages. There is always the danger of injury to internal organs, especially the bladder, to be kept in mind. Even after such injuries as those mentioned, it sometimes happens that the patient may be able to hobble along. However, he should never be allowed to do so until he has been thoroughly examined by a doctor, or the injury may be seriously aggravated.

A broad bandage of firm material must be bound round the pelvis sufficiently tightly to give relief, the patient's feelings being consulted as to this and as to the most comfortable position he can assume. Great care must be taken in lifting him ; he should be raised on a rug or blanket, placed on a stretcher, and conveyed home. The advice of a doctor must be sought without delay.

FRACTURES ABOUT THE HIP-JOINT

These may occur in old people as the result of a very slight accident, as in catching the toe in the edge of the carpet. The break then occurs inside the hip-joint, the neck of the bone being snapped across. All that is necessary in the way of first aid is to prevent the patient from walking, to move him very gently and carry him home to bed.

Other fractures result from severe violence, the neck of the bone outside the joint being broken and a wound often complicating the injury. The treatment is then the same as for fractured thighbone.

FRACTURE OF THE THIGHBONE

The symptoms are distinctive and easy to recognise ; the patient cannot raise his limb, and is in much pain. His injured leg is found to be shorter than the other, the feet being at different levels, and the injured foot will probably fall outwards by its own weight and lie on its outer side. It is most important to make no attempt at moving him until treatment has been applied. It is necessary to make the body rigid from the armpit to the ankle, so as to prevent all risk of bending the broken bone and injuring the surrounding parts with the sharp ends. The patient should be kept lying absolutely flat on his back, and something strong and long enough to reach the whole length of the body must be found. A broomstick, a rifle, a couple of billiard cues or a long piece of wood will do. This must be laid along the injured side and fixed firmly to the body by bandages applied round the chest and pelvis. The limb must then be straightened by pulling the foot down to the level of the other and placed in its natural position. Further support must then be placed about the thigh—an umbrella, a walking-stick, or a thin board as long as the thigh itself, to its inner side ; and if possible, another, even if it be but stiff, folded paper, to the back of it. More bandages must fix these to the limb, one above the fracture, one below above the knee, and one or two round the leg. Finally, the injured limb must be tied to the sound one in two or three places. The patient is now ready to be carried home if he has recovered from the shock of the accident.

Fracture near the knee-joint of the thighbone is accompanied with much less risk of injury to the soft parts. If the limb is lying fairly straight, a couple of splints, one on each side of the limb, are sufficient to give support. Two walking-sticks are suitable for the purpose. They should be tied on with triangular bandages or handkerchiefs, one above the other below the injury. If, however, the limb is bent, the more comfortable method is to place beneath the joint a thick pillow and, retaining the bent position, tie round them several bandages.

FRACTURE OF THE KNEE-CAP

This may be caused by direct violence, as in falling on the knee ; or by muscular action, as in a sudden effort to prevent a fall. The broken fragments can be easily felt with a gap between them of varying width, according to the amount of muscular contraction that has occurred and the extent to which the surrounding structures are torn ; the limb is helpless, and the knee-joint rapidly swells.

Treatment.

The great indication in treatment is to prevent the separation of the fragments, and this is best done by keeping the leg perfectly straight and preventing its bending by applying a firm splint along the back. This may consist of an umbrella or board, which should be long enough to reach the whole length of the limb, and should be securely fixed to the leg with bandages. The separation of the bones may also be prevented by applying a figure of eight bandage. Lay the centre of the bandage above the broken bone, pass the two ends round the limb and cross them behind ; carry them to the front and cross them below the knee-cap, then take them round the leg and tie with a reef-knot at one side. Cold should be applied to the knee-joint to prevent it from swelling.

FRACTURE OF THE LEGBONES

Either one or both these bones—the tibia and fibula—may be broken. As a rule, the force has been direct, as in jumping from a carriage in motion or being run over. As the skin over the shinbone is very thin, it is liable to give way, and the injury becomes compound. When both bones are broken the ordinary symptoms of fracture are present, and the injury is easy to recognise. If only one bone is affected there is more difficulty. In fractures of the tibia an irregularity can be felt by running the finger along the shin ; but when the injury involves the fibula only, the fracture often cannot be felt, and it is only by grasping the leg firmly and pressing on this bone that crepitus can be discovered. Pain is felt at the seat of fracture, even when this is far from the point pressed upon. In doubtful cases it is wisest to treat the injury as a fracture, and leave the decision to the surgeon.

Treatment.

Two splints should be used, one on each side of the leg, and they should be long enough to reach from above the knee to below the foot. They should be fixed with bandages on each side of the fracture, above the knee and round the foot. That above the knee should first be adjusted ; the foot should then be gently pulled into its natural position, and the other bandages tied. Lastly, tie both legs together with several bandages. If there is no wound the splints may be put on outside the clothing ; but when a wound is present the clothes must be removed, the wound washed and covered with a dressing. If the boot can be easily taken off, as by cutting up the sides or back, this should be done, but it should be left alone if it seems that removal is likely to do the slightest damage.

In bad fractures, especially comminuted or compound, it is often best to take a soft pillow and arrange the stuffing so as to form a trough, lay the limb in it, and tie it up with bandages.

FRACTURES AT THE ANKLE

These are very common injuries, and arise from severe twists of the foot, as in catching it in a hole whilst running, or jumping from a height. A frequent form is what is called Pott's fracture, which consists of a break of the fibula some inches from the ankle-joint and also of the extreme tip of the tibia. It is characterised by much deformity, the foot being turned upwards and outwards. It is unwise in rendering first aid to attempt to remedy this deformity by force. The foot should be put in as nearly a natural position as it will readily come to. The boot should be cut off, and a splint extending from the knee to below the foot put on to the inner or the outer side, as seems best, and fixed in position with several bandages.

EPITOME OF TREATMENT FOR FRACTURES

1. Prevent further injury by keeping the part at rest.
2. Remove clothing if necessary, by cutting up the seams and freeing the uninjured side first. Remove boots by cutting the laces or cutting up the back.
3. In compound fractures wash the wound, stop bleeding, put on a dressing and fix it with a bandage. A bandage should never be applied over the fracture itself except where it is compound.
4. Apply splints, fix upper bandage first, gently adjust limb to natural position, then apply lower bandage. Tie knots on the splints.
5. Support arm in large or narrow sling; tie legs together.
6. Arrange for transport of patient.

BEDS FOR FRACTURES

Some special preparations of the bed for fractures of the lower extremity are required, and as the patient when once placed in bed should not be again moved, these should be made at once. It is of great importance that the bed should be firm and flat, for any bulging downwards of the mattress in consequence of the patient's weight will not only make him uncomfortable, but will much interfere with the maintenance of the broken bones in a proper position. Ordinary spring beds, however comfortable they may be to the healthy, are unsuited to those suffering from fracture of the lower extremity, more particularly fractured thigh-bone. To obtain the requisite stability it is not necessary to buy an elaborate new bedstead, but simply to obtain some firm boards and lay them across the bedstead under the mattress. This also should be firm and elastic, one of horsehair probably being the best. Although a bed arranged in this way may at first seem hard and somewhat trying, a day or two is sufficient to render the patient quite accustomed to it, and the comfort it affords in the treatment of the fracture fully makes up for any little inconvenience that is felt at first. For fractured thigh the patient must also lie very flat, only a small pillow being allowed for his head.

It is well, before putting the injured person in bed, to arrange a draw-sheet as described in Chapter XLI.

CHAPTER LXVI

THE JOINTS

Varieties of Joints — The Synovial Membrane and Fluid — The Ball-and-Socket Joint—The Hinge Joint—Revolving Joints.

Varieties of Joints.

All the bones of the skeleton are united together in various ways, according to the purposes they have to fulfil, and many forms of joint are met with. Some bones are so firmly united as to make it difficult to discover any line of separation between them. This is the case with the bones of the skull in adult life. The adjacent edges of the bones may be irregular and teeth-shaped, their irregularities fitting into one another very firmly; or they may be thin and bevelled, so that one overlaps the other. In such joints there is no movement at all.

Another form of articulation or joint is that which exists between the bones of the vertebral column. Each vertebra is united to the next by an intervening layer of cartilage or gristle, which varies in thickness in different parts of the spine. This form of joint allows of but very limited movement between each pair of bones, which are firmly bound together by thick fibrous bands and membranes called ligaments. The movements of the spine, however, are in some parts quite free as the result of the combined movements of many joints. The bending movements of the spinal column are particularly free in the neck and loins, but very limited in the back, where little more than a twisting movement is possible.

The most movable joints of the body are those of the limbs, and they are divided into two chief varieties, the hinge and the ball-and-socket joints. The bony surfaces which form articulations are covered with a layer of smooth gristle which prevents them from being worn away, lessens friction, and obviates jars. Between these gristly surfaces is a cavity which is lined by a smooth membrane forming a sort of bag, the synovial membrane, the surfaces of which are kept constantly moist and lubricated by the synovial fluid or joint oil. It is this fluid which is poured out in excessive quantity in inflammation of the joint, and which is one of the chief causes of the great swelling that often follows a sprain of the part. It takes some little time to form, and does not cause the swelling which comes on immediately after an injury; this is due to bleeding into the joint. Dropsy of a joint is the accumulation of fluid in the synovial sac.

Around the joints, and occasionally in their very centres, sheets and bands of fibrous tissue are fixed which are called ligaments, and serve to hold the bony surfaces together in the various positions they assume in the course of their movements. The best examples of a ball-and-socket joint are the hip and shoulder. In these there is a cup-like hollow or cavity, lined with gristle on one side, and on the other a hemispherical or globular head, also covered with cartilage, which fits into this cavity quite closely. The ball is kept in apposition with the socket by a membranous bag called the capsular ligament, which is firmly attached to the lip of the cup and to the neck of bone which supports the ball. These joints are capable of movement in all directions.

Ball-and-Socket Joint.

The hinge joint is met with at the elbow, ankle, and lower jaw; in it the bony surfaces are curved and grooved so as accurately to fit one another, and the bones are bound together by strong ligaments all round the joint, but particularly firmly at each side. The movements are limited to one direction, as in a hinge. When these movements occur in the limbs they are called flexion or bending, and extension or straightening.

Hinge Joint.

There are two joints in which the movements are revolving or rotatory. One is the articulation of the top of the radius to the ulna near the elbow joint, in which the disc-like head of the radius is surrounded by a ring of membrane attached to the two horns of a semilunar socket on the ulna. This allows the rolling movements of the forearm which take place when the hand is twisted. The other instance is the joint of the two top vertebræ—the atlas and axis. The atlas has a semilunar socket, the ring of which is completed by a ligament, and rotatory movements of the head take place by this ring revolving round the tooth-like (odontoid) process of the axis. It is a somewhat alarming fact that the breaking of this narrow band would mean instant death from pressure on the spinal cord, and yet how seldom does such an accident happen!

Revolving Joints.

CHAPTER LXVII

DISLOCATIONS, SPRAINS AND STRAINS

Varieties of Dislocations—Causes—How to Recognise Them—How to distinguish Them from Fractures—Dislocations of the Lower Jaw, of the Shoulder, of the Elbow, of the Fingers and Thumb—Displacement of Cartilage in the Knee-joint—Sprains—Strains.

Varieties.

A DISLOCATION is the displacement of the bones which form a joint. If the joint surfaces are completely separated, as occurs in the ball-and-socket joints (shoulder and hip), it is called a complete dislocation. If they are only displaced but still remain partially in contact, it is incomplete, and is the usual condition in a hinge joint (elbow and knee) dislocation. If a wound be present which communicates with the joint, the dislocation is spoken of as compound.

Some joints are far more liable to dislocation than others, the shoulder-joint, for example, being affected as frequently as all the other joints put together. This is explained by the formation of the joint, which is designed to allow the greatest freedom of movement; its concavity or cup is very shallow, its ligaments somewhat loose and weak, and its strength dependent chiefly upon the surrounding muscles, which may be taken by surprise in a sudden accident. Children do not often suffer from dislocation, for injuries to their joints are far more likely to break the bones across at the epiphysis (p. 211) than to displace the joint. In old people also fracture is more common than dislocation, for their bones are brittle and their ligaments tough. If a joint has once been dislocated, it is very liable to a recurrence from but slight violence.

Causes.

The causes of dislocation are either direct violence or muscular action. Violence may be extreme and applied to the joint itself, forcing the bones apart; or it may be applied at a distance and displace the joint by acting on the limb as a lever. The latter is a common condition in dislocations of the shoulder, which are often caused by falls on the hand. Muscular action is not unfrequently the cause of displacement of the lower jaw, which has been known to occur during a violent yawn. A partial displacement also explains the cracking noise some persons experience whilst eating, which is due to the small pad of gristle in the joint slipping in and out of place.

How Dislocations are recognised.

In examining a person after a severe blow or fall, the injured part is sure to be exceedingly painful, and the patient finds he is unable to move it. This symptom is common to bruises, dislocations and fractures, and what we have to do is to recognise which of the three is present. Unless the injury is seen immediately after the accident, much swelling has probably occurred as the result of bleeding from the torn parts under the skin, or from the onset of inflammation, and so the difficulty of our task is much increased. We should therefore examine the injury as early as possible.

A dislocation can only occur at a joint, and the situation therefore may be some guide to us. We next carefully examine the part to see if there is anything unnatural in its appearance. In both dislocation and fracture there will be some distortion or deformity. We may feel the end of the dislocated bone protruding at some unusual spot in the neighbourhood of the joint, or we may notice that the general direction of the limb is changed, or that the length of the limb is altered, it being either shorter or longer than usual. If still uncertain, we must gently raise the limb and attempt to move it. If we find it fixed and stiff, dislocation is more likely to be present. If it is more movable and loose than natural, fracture is probable. In this manipulation we may feel the grating or crepitus which proves the presence of fracture. By holding the limb firmly and gently drawing on it, the deformity may disappear, as in fracture, or it may remain unaltered, as in a dislocation.

The signs of dislocation are therefore :—

1. A change of shape in the joint.
2. The end of the bone is felt in a new position.
3. The direction and length of the limb are altered.
4. The joint is immovable, stiff, and painful.

A dislocation is distinguished from a fracture by the following symptoms :—

1. The injury involves a joint.
2. The limb is stiff and immovable.

3. The deformity cannot be removed by a gentle pull.
4. There is no crepitus.

The treatment of dislocation consists in its reduction—that is, the return of the bone to its natural position. This is often very difficult and requires much anatomical knowledge and manipulative skill. The replacement of the bone is resisted by the surrounding muscles (which are irritated by the pain and injury), and also by the torn ligaments through which the end of the bone has often forced its way. A surgeon can replace the bone either by extension—that is, dragging in certain definite directions, according to the nature of the injury—or secondly, by manipulation—that is, movements whereby the end of the bone is made to retrace its original course through the torn structures. Both of these procedures are much facilitated by the use of an anæsthetic. Neither of them is safe nor even possible in the hands of the unskilled. Most dislocations, therefore, must be treated by temporary measures, which will place the injured part at rest and prevent any further damage being done.

An arm should be supported in a well-applied large arm sling, and a leg with a splint, or by keeping the patient in the recumbent position in whatever attitude he may find most comfortable. The swelling, pain, and subsequent inflammation may be benefited by the application of cold water cloths or ice, and if the patient is much collapsed and upset by the injury, he must be kept warm and given some simple drink. A compound fracture should, of course, be treated with antiseptics, or serious consequences will follow.

The following particulars of some special dislocations will be found of assistance, more especially to those far removed from professional assistance.

DISLOCATION OF THE LOWER JAW

The lower jaw is usually dislocated on both sides at once. The patient then cannot close his mouth, and the front teeth are separated to the extent of an inch to an inch and a half. Speaking and swallowing are difficult, and the saliva dribbles out of the mouth. The dislocation may be reduced by the following measures: Wrap handkerchiefs round both the thumbs; stand facing the patient; place the thumbs in the mouth on the back teeth, and press with them forcibly downwards and backwards, and at the same time raise the chin with the fingers spread out and placed underneath the front of the jaw. The bone often slips back into the joint with a sharp snap, so that the thumbs will be bitten unless well protected. The four-tailed bandage or jaw bandage should then be applied, and the patient must not be allowed to talk or to eat any solid food for several days.

DISLOCATION OF THE SHOULDER

When the shoulder-joint is dislocated the deformity is very marked. The rounded head of the bone forms a distinct projection, the shoulder is flattened or even hollowed out, and the parts are painful and immovable. The large arm sling should be applied to support the arm, and a broad bandage tied firmly round the arm and body to prevent all movement of the joint. The sooner the dislocation is reduced the easier the task will be.

DISLOCATION OF THE ELBOW

The most common dislocation of the elbow-joint is that in which the bones of the forearm are carried backwards. It is known by the marked projection of the "funny bone," or olecranon, backwards. The arm should be supported on a splint, which should be formed of two pieces of flat wood tied together to form a right angle. Bandages should be applied round the splint and arm, both above and below the elbow joint, and the whole should then be supported in a large arm sling.

DISLOCATION OF THE HIP

A dislocation of the hip-joint is a serious injury, and the difficulty of relieving it is much increased by delay. It should therefore be reduced as soon as medical aid can be obtained. In the meantime, the part should be kept absolutely quiet, and no attempt be made to stand up. If the pain is severe it may be relieved by hot fomentations.

DISLOCATION OF THE FINGERS AND THUMB

The digits are not unfrequently dislocated, a condition readily recognised by the resulting deformity. It may be treated by a steady pull without employing much force, and the joint often returns into position with a sharp snap. A splint should be applied and fixed on firmly with a bandage to prevent a recurrence. Dislocations of the thumb are sometimes very difficult to relieve, and require more force than it would be safe for any but a surgeon to employ.

DISPLACEMENT OF CARTILAGE IN THE KNEE-JOINT

A not unfrequent accident, which requires immediate treatment, is the displacement of the semilunar cartilages of the knee-joint. These are two crescentic pieces of gristle, which lie in the joint between the bony surfaces. As the result of a trip when walking or of a twist in active exercise, such as lawn-tennis or hockey, one of these may be displaced and become nipped by the bones. A sharp, sickening pain is felt in the knee, and the patient usually falls down. On attempting to rise he finds that the leg cannot be straightened, and any attempt to do so causes much pain; the limb also is fixed in a slightly bent position.

Treatment.

The treatment necessary to replace the cartilage consists in bending the knee, and then, whilst the patient's attention is otherwise engaged and the muscles are thus taken by surprise, rapidly to straighten it, and at the same time give the leg a slight twist. The injury is usually followed by a good deal of swelling (synovitis) of the joint, to prevent which a firm bandage should be applied as soon as the displacement has been remedied. That this has been done successfully is shown by the patient being able to move the leg freely, without pain or difficulty. An elastic knee-cap should be worn for some time to support the joint, and if the accident is repeated an operation may be thought requisite by which the loose cartilage is removed.

SPRAINS

A sprain is an injury to a joint caused by a violent twist or wrench, whereby its ligaments are stretched and sometimes torn. The accident is most common in the wrists and ankles, but any of the movable joints may thus suffer.

The pain produced is very severe and sickening, and the results which follow depend upon the severity of the injury. Swelling of the joint rapidly sets in from a collection of fluid caused by inflammation of its lining membrane. If the ligaments have been much torn, bleeding occurs both into the joint and the surrounding structures, and the parts grow "black and blue" from bruising. The inflammation subsides very slowly, recovery being tedious; indeed, a severely sprained joint takes almost as long to get well as a broken bone. The joint is liable to continue weak, stiff, and painful for a long time, and in persons of rheumatic or gouty tendencies long continued trouble is likely to occur from the proneness that these conditions show to settle in an injured and weakened spot.

Treatment.

The first thing to be done in attending to a person suffering from an injury of this sort is to make certain, if possible, that there is no fracture of a bone in the neighbourhood of the joint. The signs of fracture we have already described (p. 254), but if the case is not seen quite early after the accident the pain and swelling make it exceedingly difficult to form a definite opinion. It is then far better to treat it as a fracture, for no harm can come from over-care, but much severe injury may follow an overlooked and ill-treated fracture.

If we come to the conclusion that we have only a sprain to deal with, the first thing to be done is to apply firm pressure to the injured part, as it will check the bleeding from the torn ligaments, and to a great extent prevent the swelling of the joint. Cold has the same effect, so that it would be good treatment to wet the bandage before applying it, or to dip the bandaged limb into cold water. The bandage may be a neatly folded handkerchief, a "narrow" triangular bandage, or a roller bandage. It should be applied firmly, so as to exert some pressure, and if a roller be used the first turn should be passed straight round the joint, and the succeeding turns above and below in gradually enlarging figures of eight (p. 243).

In treating a *sprained ankle* it is unwise, when the patient is far from home, to remove the boot, for swelling will rapidly occur and make it impossible to put it on again. The best plan is to apply the bandage tightly round the boot, then wet it to tighten it up, and get the patient home as quickly as possible.

A *sprained knee* requires particular care, as the joint is a large and complicated one, and a considerable quantity of fluid rapidly collects in it. The patient should never be allowed to walk if any of the joints of the lower limb are sprained, for this is sure to aggravate the injury. If possible, a firm splint should be placed along the back of the leg for a sprained knee. Some persons believe it possible to walk off sprains, and this may be done when the injury is but slight, but much harm will follow such an experiment if there has been a severe twist with tearing of the ligaments.

When the *wrist*, *thumb*, or *fingers* are sprained the wet, firm bandage should be first applied, and the limb should then be supported in a sling and kept completely at rest.

When the patient, whatever the nature of the sprain, has got safely home, the bandages may be removed. With a sprained ankle the boot and stocking must be carefully taken off, and it will often be found necessary to cut them open to do so, and thus avoid putting the patient to unnecessary pain and injuring the joint by avoidable movement. The joint should then be rested, the injured ankle or knee on a pillow, the arm in a sling, and the cold water treatment continued. A rag or lint wrung out of evaporating lotion made of some spirit and water, or lead and opium lotion, should be laid over the joint. Later, hot applications will be found more grateful to the patient's feelings, and will soothe away the inflammation and relieve the pain. Hot fomentations, linseed, bran, or oatmeal poultices may be tried. There is no doubt that the cure of sprains may be expedited by skilfully applied massage and passive movements of the part. These measures will hasten the removal of the bruising and swelling, and rapidly relieve the pain. They also lessen the liability to stiffness and weakness of the joint in the later stages.

These later stages are very tedious. The joint continues to be stiff, painful, and swollen for a long time, perhaps for many weeks. The treatment for such conditions should be firm rubbing and kneading with soap liniment or iodide of potash ointment, frequent douching with very hot water, the benefit from which is increased by its being poured from a height, or by placing the foot under a tap of hot water, and lastly by wearing during the day a well applied elastic bandage. Some surgeons advise covering the whole joint with strips of adhesive plaster, which secure rest, immobility, and pressure.

STRAINS

A strain is the stretching of some muscle or tendon as the result of sudden exertion or over-use. The fibrous structures may be so dragged upon as to tear. The injury is met with usually about the shoulders, hips, and back. Such an accident is immediately followed by a sharp, severe pain, which is much increased by movement, and makes all exertion impossible. The part may become swollen and very tender, and in the later stages may be very stiff. Some strains are followed by great wasting of the injured muscle, and in rheumatic persons by persistent pain and stiffness.

The patient should be taken home as quickly as possible without allowing him to use the part; if the back or leg is injured, it is necessary that he be carried. The further treatment includes rest, hot fomentations, and rubbing. The rest should be continued until the acute pain has subsided. The fomentations will relieve the pain, swelling, and inflammation, and the rubbing will remove the pain and stiffness. A useful liniment consists of equal parts of the liniments of belladonna and chloroform. A strained back requires particular care and rest in bed until the severe symptoms have subsided. A course of massage and passive movements can be strongly recommended, and in the later stages friction, hot douches, and electricity to restore the wasted and weakened muscles.

Treatment.

It is important to remember that what is often looked upon as only a strain in the groin may turn out to be a rupture. A swelling is then discovered, with other symptoms which accompany this condition, and quite special treatment is required (p. 197).

CHAPTER LXVIII

HÆMORRHAGE

Capillary, Venous and Arterial Hæmorrhage—Effects of Hæmorrhage—Internal Hæmorrhage and its Treatment—Natural Arrest of Hæmorrhage—First-aid Treatment—Application of Pressure—The Tourniquet—The Arteries and their Pressure Points—Treatment of Capillary and Venous Hæmorrhage—Treatment of Burst Varicose Vein.

Bleeding is one of the great emergencies that it may fall to the lot of all of us to treat, and great will be the regret of those whose ignorance fails to avert disaster. There are few emergencies in which moments are of such importance, and in which minutes may mean the difference between life and death. In ordinary accidents the delay in obtaining a surgeon's aid is not usually followed by serious consequences. But with a wound of a large blood vessel a person may bleed to death in the course of a few minutes, and proper measures to arrest the hæmorrhage must be adopted immediately, or they will be too late. It is of the utmost importance, therefore, that all should know what steps to take without referring to books or waiting for skilled assistance. Fortunately, the proper treatment is within the power of all, and it requires but little knowledge and experience to arrest bleeding temporarily.

If reference be made to the description of the organs of circulation (Vol. I., p. 183), it will be found that the motive power which keeps the blood flowing is the muscular substance of the heart, that this power is chiefly expended in distending the elastic walls of the arteries, that the flow of blood through those vessels is therefore powerful, rapid, and in jerks, that the elasticity of the arteries is the cause of the flow through the veins and the intermediate vessels or capillaries, and that the current of blood in these is therefore slow, gentle, and continuous. Again, it was explained that the blood in the arteries is bright red in colour, whilst that in the veins is of a dark purple hue. These facts are of importance now that we are considering hæmorrhage, for it is by them that it is possible to recognise the source of the bleeding—whether it is from an artery or a vein.

Bleeding may be from a wounded artery or vein, or from a raw surface, and we therefore speak of *arterial*, *venous* and *capillary* hæmorrhage, each of which has special signs by which it is recognised, and special treatment by which it is controlled.

Capillary Hæmorrhage.

Capillary hæmorrhage is the least important of the three, and is merely the gentle oozing of blood from the cut or torn surfaces of a wound. It is accompanied by no danger unless it be left unattended to, when a large quantity of blood may be gradually lost and give rise to the constitutional effects of hæmorrhage.

Venous Hæmorrhage.

Venous hæmorrhage is of more importance, for if a large vessel is wounded the blood pours out very freely, and much may be lost in a short time. The blood from a vein is of a dark colour, and flows in a continuous and uniform stream without any jets corresponding to the heart's beat, and it issues chiefly from the end of the divided vessel farthest from the heart. It is much increased by any pressure on the vessel between the heart and the wound, by the parts being allowed to hang down, or by any contraction of the muscles of the limb.

Arterial Hæmorrhage.

Arterial hæmorrhage is the most serious of all, and if a large artery is wounded is very dangerous. The blood that escapes is of a bright scarlet colour; it flows in jets corresponding with the heart beats, and issues from the part of the vessel nearest to the heart. The blood sometimes spouts to quite a distance from the wound, and may thus be instantly recognised as being arterial. The larger the artery the greater is the force of the jet.

Effects of Hæmorrhage.

If a large quantity of blood is lost the patient becomes faint and sick, the whole body gets cold and white, there are great restlessness and nervous disturbance, complaint of intense thirst, noises in the ears, and loss of sight. If it remains unchecked unconsciousness sets in, with gasping breathing and deep sighs; occasionally convulsions occur, rapidly followed by death. If the bleeding is less copious but frequently repeated, an intense form of anæmia is set up—extreme pallor, palpitation of the heart, rushing noises in the head, and a tendency to faint upon the slightest exertion or upon standing up, or even raising the body in bed. Loss of blood is borne far worse in infancy and old age than in early adult life.

Internal Hæmorrhage.

The bursting of a blood vessel into one of the cavities of the body causes internal hæmorrhage, the blood being poured out in large quantity and filling up the cavity. A similar condition is caused by a wound of one of the large arteries of the chest and abdomen. The symptoms of internal hæmorrhage are those that have just been mentioned as following severe external hæmorrhage, but they occur without evident cause, or at any rate without any evident bleeding. Their appearance is quite sufficient to lead us to assume that bleeding is taking place internally, but the seat of the hæmorrhage can only be recognised by other local symptoms, such as pain or signs of pressure.

We have already dealt with bleeding from the lungs and its treatment (Vol. I., p. 290), from the stomach (Vol. I., p. 91), from the bowels (Vol. I., p. 95), and from piles (Vol. III., p. 193).

Treatment of Internal Hæmorrhage.

As internal hæmorrhage is accompanied with great danger to life, it is unsuited for domestic treatment, and medical assistance should be sent for with the utmost urgency. In the meantime, proceed to do all possible to arrest the hæmorrhage and succour the patient. He should at once be laid perfectly flat, and even the pillows under his head should be removed. The foot of the bed may be raised by placing blocks of wood or other convenient articles under the legs; the patient's legs may be held up a little, and a roller bandage applied to them from the foot up to the hips to drive as much blood as possible to the more important organs, particularly the heart and brain. The clothing round the neck, chest and abdomen, and anything that impedes breathing, should be loosened; fresh, cool air should be allowed in abundance. Faintness must be relieved by fanning, by cold water sprinkled on the face and chest, and by smelling salts, but on no account should any stimulant be given, for the effect would be, by increasing the heart's action, to encourage the bleeding and so to aggravate the condition we are seeking to remedy. Transfusion of blood (the injection of blood into the veins) is one of the methods at the disposal of the doctor, and it may be to a great extent imitated by injecting into the lower bowel a quantity of warm salt and water. The temperature of the water should be that of the body or about 100° F., and one teaspoonful of common table salt should be added to each pint of water. A couple of pints may be administered with great advantage.

Natural Arrest of Hæmorrhage.

There are certain means that are adopted by Nature for the arrest of hæmorrhage. First, there is the failure of the heart's action and the occurrence of faintness, by which the loss of blood is stopped by the cessation of the circulation. This is only a temporary measure, but it teaches us that to give stimulants whilst hæmorrhage is continuing is quite wrong. The second natural means of stopping bleeding is the clotting of the blood as it flows from the vessels. This tends to close up the orifice, and in moderate-sized vessels is quite sufficient to stop the bleeding temporarily. Nature has also provided the arteries with elastic and muscular coats, which have a tendency, immediately a vessel is cut across, to contract and shrink, and thus to close up the wound. Lastly, inflammation is set up in the injured vessel, plastic lymph forms within and seals the orifice, and finally becomes changed into a firm fibrous tissue, which effectually prevents any further bleeding.

First-aid Treatment of Hæmorrhage.

The one method of arresting hæmorrhage in first-aid treatment is the employment of pressure. This may be applied in various ways and in many situations, as will be explained later, but it is important to understand that in all forms of hæmorrhage, whether it be simple oozing from a wound or the rush of blood from the largest artery, properly applied pressure is capable of stopping it at least temporarily.

Application of Pressure.

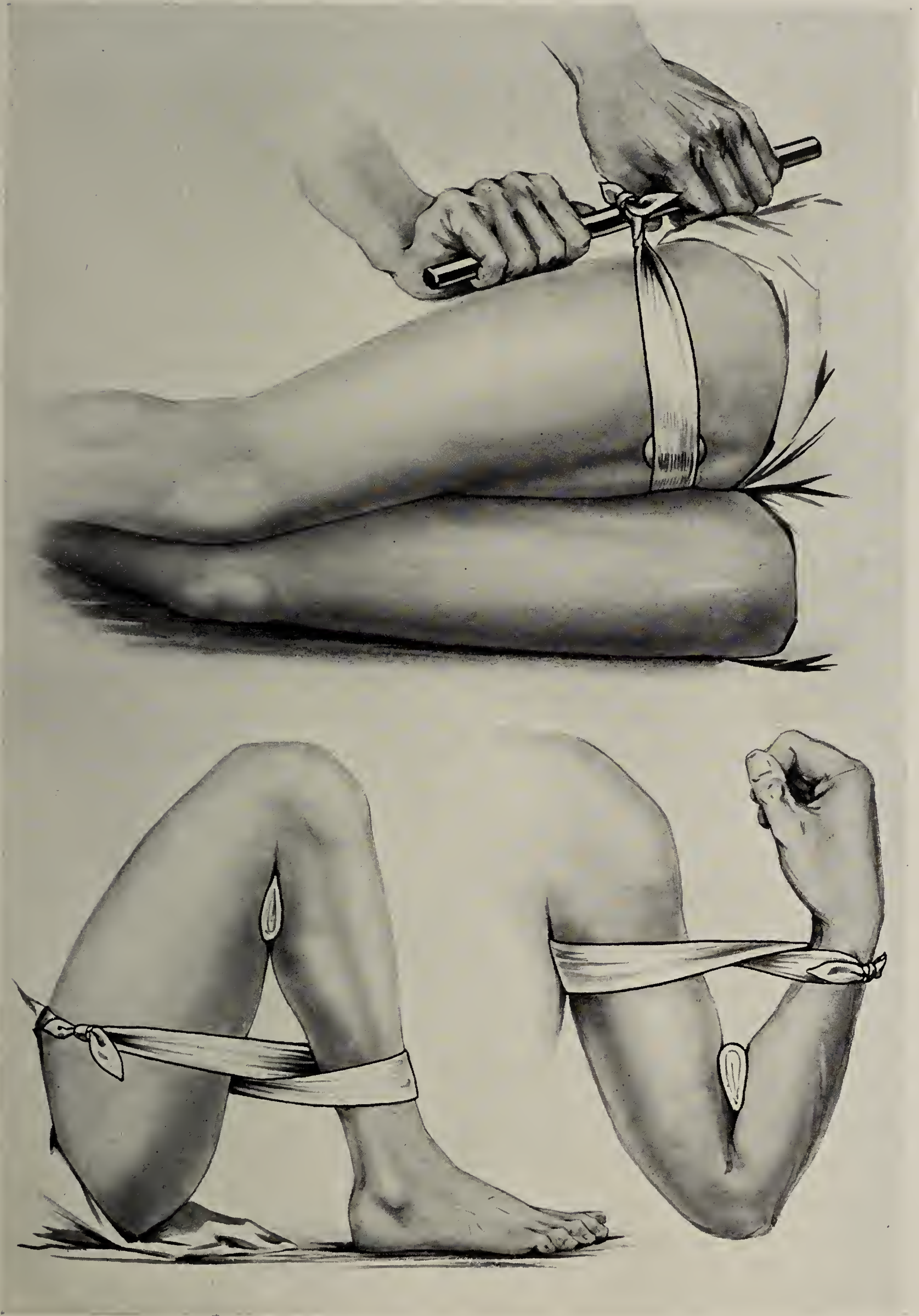
Pressure may be applied directly to the bleeding point with the tip of the finger in the actual wound, and the most profuse hæmorrhage from the largest artery may be temporarily checked in this way. This method is useful to prevent further loss of blood whilst apparatus is being prepared to stop it more permanently.

A more convenient method of exerting pressure is, however, with a pad of lint or other suitable material. The pad may consist of several layers of the lint made by folding up a large piece, or of a handkerchief folded small, and it is made more efficacious by enclosing in its centre some small hard body, as a stone, marble, nut, coin or cork. The pad is placed directly on the bleeding point, and is then kept in position and firmly pressed on the spot by a few turns of bandage or a folded handkerchief. This is a very effectual method of treatment, and is that which we should strongly advise in all forms of bleeding as the first measure. It may be supplemented or replaced by other methods if they seem more suitable afterwards, but as a routine, adopt the pad and bandage.

Having thus obtained time, we may think it necessary to apply further pressure. It may be applied at some distance from the wound to the vessel from which the blood is flowing, but this requires knowledge of the situation of the vessel and also of the right point to choose for its most successful application. This knowledge can easily be acquired by any intelligent person, and it will be set out later. Before using indirect pressure, it is necessary to decide whether the bleeding is arterial or venous by the distinctive signs already given. If it be arterial, the pressure must be exerted on the artery between the wound and the heart, and if it be venous on the vein farther away from the heart than the wound. The fingers may be employed for this purpose, but it is very difficult and fatiguing to maintain this form of pressure for any considerable time: the hand quickly aches, the muscles grow fatigued, and the pressure is relaxed. It must soon be supplemented by some form of improvised instrument. The handle of a large key may be wrapped up in a handkerchief to protect the skin from injury and pressed firmly on the right spot, or some form of tourniquet may be devised and fixed to the limb.

The Tourniquet.

A tourniquet consists of a strong band which is tied round the limb, and a pad which is placed beneath it, in such a position as to compress the artery. To improvise such an instrument in an emergency, a handkerchief or triangular bandage may form the band; or, better still, some elastic article, as a brace or belt, and the pad may be made of another handkerchief, triangular bandage or similar article rolled up firmly to the requisite size. A roller bandage about 1 inch thick makes an excellent pad, or a small hard body wrapped in a cloth may be used. The pad being placed on the right spot, the band is laid over it, carried round the limb with firm pressure, then tied tightly over the pad. If necessary, the pressure may be increased by passing a stick through the bandage on the opposite side of the limb to the pad, and twisting it up until the bleeding ceases. The stick must be retained in position with the hand, or by another bandage tied round one end. This method is an effectual way of controlling hæmorrhage, but it is very painful to the patient, and if over-



IMPROVISED TOURNIQUETS.

done may injure the limb and bruise the parts. It may also cause mortification of the limb below by cutting off its blood supply if continued too long—that is, for many hours.

The tourniquets used by surgeons are of several patterns. A strong indiarubber tube, long enough to encircle the limb two or three times, was introduced by Professor Esmarch; it is wound round the part firmly, and then tied or fixed with hooks attached to the ends. The field tourniquet consists of a strap which encircles the limb and is buckled over a pad, whilst the screw tourniquet has a screw apparatus, by tightening which the pressure of the pad may be increased. These instruments are not likely to be at hand for first-aid use, but their principle can be imitated by the improvised instrument which has been described.

Another method of applying pressure which can be used for the arteries at the knee and elbow, is to place a pad in the bend of the joint and then firmly bend up the limb and tie it in that position with a bandage.

The Arteries and their Pressure Points.

The *aorta* is the largest artery of the body. It commences at the left ventricle of the heart, and forms an arch above and behind that organ. It is situated entirely within the chest, and when wounded is followed by death from an enormous rush of blood. Such an injury is beyond human aid. From the convexity of its arch it gives off a number of branches which carry blood to the head and neck and the two arms; they are the innominate (which divides into the right carotid and subclavian), the left carotid and the left subclavian. The aorta passes then downwards at the back of the chest and abdomen, giving off branches to the surrounding parts in its course, and ends on a level with the navel by dividing into two arteries, which convey the blood to the lower extremities.

The two *carotid arteries* are situated in the neck, passing up on each side of the windpipe and larynx. The spot most convenient for compressing them with the finger is on a level with the lower part of the thyroid cartilage, or "Adam's apple." On a level with the upper part of this cartilage they each divide into the internal and external carotids. The *internal* passes deeply, and enters the skull through an opening in the bone close to the ear to supply the brain with blood. The *external* carotid passes up between the jaw and the ear, and ends in the temporal artery on the temple and the side of the head. One of its branches, the *facial* artery, curves upwards from the neck on to the face over the edge of the jaw; its beat can be felt by pressing on the bone 1½ inches in front of the angle.

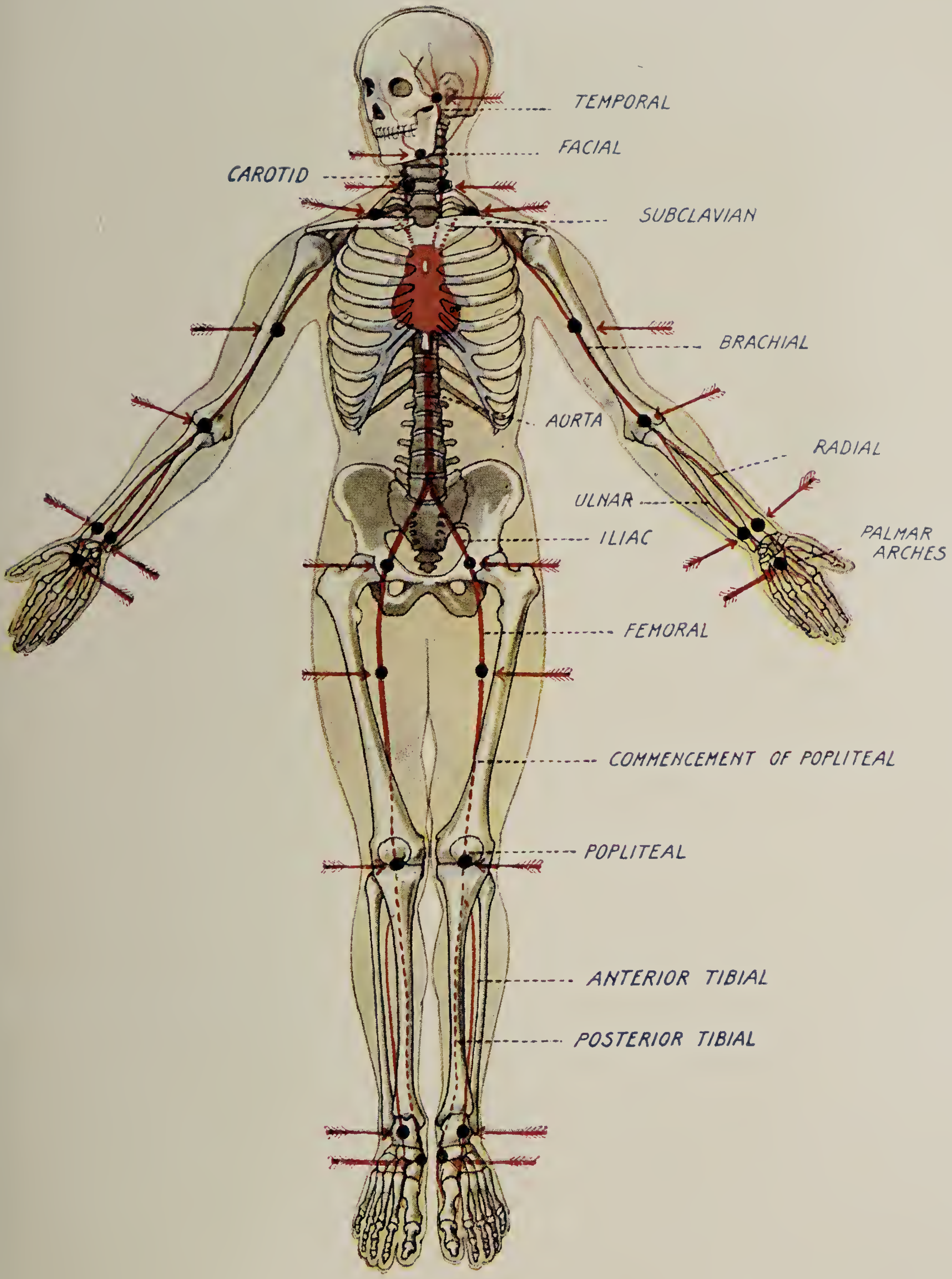
The *subclavian* artery on each side is situated behind the inner end of the collarbone, and lies upon the first rib, where its pulsation can be easily felt, especially when the arm is well drawn down. This is the spot where it should be compressed with the thumb or a suitable instrument. It continues its course into the armpit as the *axillary* artery, and downwards along the arm under the name of the *brachial* artery. The latter vessel runs down the inside of the arm to the inner side of the big biceps muscle, from the middle of the armpit to the middle of the bend of the elbow; it can be felt throughout the whole of its course, the line of which roughly corresponds with the inner seam of the coat sleeve. Some large nerves lie in close contact with it.

It may be compressed in any part of its course with the fingers or a tourniquet.

Just below the bend of the elbow the brachial artery divides into two branches, the *radial* and *ulnar* arteries. These two vessels separate from one another, and pass down opposite sides of the arm, the direction of the radial being from the middle of the bend of the elbow to the outside of the wrist. It lies upon the bone in the latter situation, can be easily felt, and is usually chosen as the most convenient artery from which to count the pulse. The ulnar artery extends from the same spot above to the inner side of the wrist at the root of the little finger. These two arteries end by dipping into the palm. They there join with one another, and form the two arches of the palm. Branches from these arches pass to the fingers, one vessel running down each side of the finger, and the two join together at its tip.

The arteries of the chest and abdomen need no separate description.

The large vessel which carries blood to the leg is called the *femoral* artery, and passes out of the abdomen into the thigh at the middle of the groin. At this spot it lies on the bone which forms the edge of the bony basin, or pelvis. Its pulsation can here be plainly felt close to the surface, and it is in this position that pressure can be applied to check arterial hæmorrhage from all parts of the leg. The femoral artery runs from this point downwards and inwards to the inner side of the thigh, and dips through the muscles to reach the ham or hollow behind the knee, where it is known as the *popliteal* artery. In the upper two thirds



PRESSURE POINTS FOR THE ARTERIES.

of its course it can be compressed with a tourniquet. The popliteal artery can be felt throbbing in the centre of the hollow. By placing a pad in the ham and bending up the knee, it is compressed against the bone. At this spot it divides into the two *tibial* arteries, the *anterior* of which passes forwards between the two bones of the leg and reaches the front, but is too deeply placed to be felt until it arrives at the ankle. Passing over the front of the ankle-joint, it runs along the foot to the space between the big and second toes. The *posterior* tibial artery keeps to the back of the leg, but does not come near the surface until it reaches the ankle-joint. Its pulsations are quite evident behind the bony projection of the inner ankle, and compression may be applied to it to stop bleeding from the sole. It terminates its course in the sole of the foot by giving off a number of branches to the sides of the toes.

Situation of the Veins.

The course of the large veins need not be separately described, for they run in company with all the external arteries that we have been considering, and are called by the same name with the single exception of the vein accompanying the carotid artery in the neck, which is called the jugular vein. These large vessels form the deep veins. More superficial veins lie just beneath the skin, are liable to be implicated in wounds, and may even bleed freely, especially if they have become enlarged or varicose.

Treatment of Venous Hæmorrhage.

When treating bleeding from a vein, place the patient in a recumbent position with the head low, raise the affected part if it be arm or leg, and uncover the wound. If blood is flowing freely, place the thumb or finger firmly on the spot and maintain the pressure until a pad and bandage are ready. Then place the pad over the bleeding point and apply the bandage firmly round it and the limb. If this measure be unsuccessful, put on a firm bandage round the limb, or apply a pad over the vein and fix it with a tight bandage farther from the heart than the wound. It is necessary also to remove anything that may interfere with the free return of blood to the heart, and which thus causes congestion of the veins, such as straps, bandages or garters.

The oozing of blood from a wound can usually be stopped by applying a pad of some clean material to the bleeding surface, and fixing it in position with a firm bandage. The limb should also be raised in order to overcome the tendency to congestion of the part produced by gravity. Uncovering the wound and exposing it to the air for a time is often sufficient to arrest this form of bleeding. If it is not, the wound should be douched with cold or iced water, or with water as hot as the patient can bear. Warm water will increase the hæmorrhage, but very hot or cold water will stop it. Soak a clean handkerchief in very hot water, lay it on the wound, and then apply a tight bandage over it. Or pour cold water over it from a jug or tap for some time.

Treatment of Capillary Hæmorrhage.

If all these measures fail some drug must be used. The best styptics, as these drugs are called, are tannin, alum, collodion, extract of witch hazel or hazeline, and perchloride of iron. The two first may be powdered over the wound, collodion may be soaked on cotton-wool and laid over the surface, witch hazel extract may be dabbed on with wool, and tincture of perchloride of iron may be mixed with an equal quantity of water and poured into the wound. It is far better to avoid such applications if possible. They cause pain, foul the wound, especially the iron preparation, and are liable to interfere with healing. Such popular remedies as blotting-paper, cobwebs, and similar messes are liable to contain dirt and germs, and should be avoided.

Treatment of Burst Varicose Vein.

Bleeding from a varicose vein should be treated similarly to venous hæmorrhage generally. Lay the patient down, remove all pressure from the leg between the bleeding point and the groin, such as a garter or bandage, raise the leg, press the thumb on the bleeding spot until a pad and bandage are ready, then place the pad over the wound and fix it firmly with the bandage. If this be insufficient, apply a roller bandage evenly from the foot up to the groin. The leg should be rested for a few days, and the bandage worn until the wound has had time to heal.

CHAPTER LXIX

TREATMENT OF BLEEDING FROM VARIOUS PARTS

Bleeding about the Head—Bleeding from the Neck—From the Armpit and Upper Arm—From the Lower Arm and Elbow—From the Forearm—From the Hand—From the Thigh—From the Leg and Foot—Epitome.

Bleeding about the Head.

HÆMORRHAGE from wounds of the head is especially suited for treatment with a pad and firm bandage, as the bony surface of the skull lies just beneath and supplies a firm resistance to the pressure. Some of the larger trunks may bleed freely, and will require instant attention. When the *temporal artery* is wounded and the blood is seen spurting from the spot, the thumb should be at once pressed upon it, and the pressure maintained until a pad is ready to take its place. The pad is kept in position by a bandage applied as follows: Place the centre of a bandage, folded narrow, on the opposite side of the head, carry it round the head and forehead, keeping it low down to the brows in the latter situation, twist the ends together over the pad; then carry one over the head, the other under the chin, and tie them with a reef knot over the uninjured temple. The temporal artery can be felt beating just in front of the ear, and can be compressed against the temporal bone, but this procedure is not of much use, and will not stop the bleeding, for there is free communication between it and the other arteries of the scalp.

Bleeding from the *facial artery* or its branches to the lips and chin may be lessened by pressure on the vessel as it passes over the border or edge of the lower jaw 1½ inches from its angle, but here also the communication with other arteries is so free that pressure on the bleeding spots is the safer treatment. For bleeding from the *lips* the plan of treatment is an exception to the rule of applying pressure against a bone, for it is far better to compress them between the fingers in the mouth and the thumb outside on the face. The artery runs along the lips, about ⅓ inch from their edges. A similar method is advisable for bleeding from the cheeks.

Bleeding from the *mouth*, *tonsils*, *throat*, and *tongue* may best be stopped by sucking ice, as pressure is not admissible except to the tongue, which can be compressed between the fingers if necessary.

Bleeding from the *gums* and *tooth socket* after extraction of a tooth is sometimes a troublesome matter. The oozing of blood may continue for hours or even days after the operation, and may be sufficient to cause a severe condition of anæmia and exhaustion. The first measure to employ is washing out the mouth freely with iced water. If this fails pressure must be applied. A long, wedge-shaped piece of lint should be used, and its pointed end wetted with oil of turpentine. This should be gradually pressed into the socket, and the strip should then be folded and refolded upon itself so as to make a firm pad large enough to fill the space between the bleeding point and the teeth of the other jaw. The mouth should then be closed and the pressure maintained by the other jaw, a bandage being tied under the chin and over the head. A piece of cork may be placed on the top of the pad of lint, and the teeth of the other jaw kept pressed against it by a bandage.

Bleeding from the *nose* is usually unimportant, and soon ceases, but in certain cases the loss of blood is very free, or one attack follows another with great frequency and reduces the patient to a state of severe debility. In some people a slight blow on the nose, or even the strain of a violent sneeze or in blowing the nose, starts the bleeding. At other times epistaxis (as nose bleeding is technically called) is a sign of disease of some internal organ, especially of the liver and brain, when it is chiefly met with in old people. In young people the attacks of bleeding may be preceded by flushing of the face, buzzing in the ears, a sense of heaviness, or even severe headache, all of which are relieved by the bleeding. It is sometimes salutary also in young women with irregular losses. In such the condition need excite no alarm, and is of trifling importance; but in the aged it must never be disregarded, for they are sure to suffer from the loss of blood, and in some cases it is so free as to lead to a fatal result.

The milder forms can usually be relieved by cold water or ice applied to the nose and forehead, by snuffing cold water up the nose, or introducing a piece of ice up the nostril. The patient should sit down with the head thrown slightly back. All tight clothing around his neck and chest should be undone, and he should raise his arms well above his head for a minute or two. A cold key may be slipped down the back, or cold water sponged over the upper part of the spine. Squeezing the sides of the nose together between the finger and thumb, passing the finger up the nostril from which the blood escapes and retaining it there, sniffing powdered alum or tannin up the nostril, pressing up it a strip of lint with some of one of these powders sprinkled on it, or syringing out the nostrils with iced water, are all measures that may be found useful.

Occasionally all domestic remedies fail to check the bleeding, and a surgeon's assistance is required. He may consider it necessary to plug up the nostrils, both back and front, with pieces of lint, a proceeding most disagreeable and troublesome to both patient and doctor.

It is important to remember that when the head is held back the blood may run into the throat and stomach, thus giving the impression that it has ceased, only to excite alarm when the blood is brought up by vomiting. Frequent attacks require care of the general health. The bowels must be kept free, the liver and digestion must be regulated, the food must be moderate, stimulants omitted, over-exertion and stooping avoided.

Bleeding from the Neck.

Bleeding from the smaller arteries of the *neck* can be treated in the ordinary way, by pressure of the finger, followed by the application of a pad and bandage, but care is needed not to apply the bandage too tightly, or it will constrict the windpipe and interfere with the breathing.

When the large artery of the neck—the carotid—is wounded, it requires the utmost courage and energy to cope with the injury, and puts the most capable on their mettle. The wound is seldom due to accident, but is caused either with suicidal or with murderous intention, and it is the artery on the left side that is the more often injured. The only course possible is without the slightest hesitation to push the thumb deep into the wound and compress the bleeding vessel. The fingers of the same hand grasp the neck and exert counter-pressure at the back. The pressure should be directed backwards and inwards toward the back of the windpipe, for in that situation the bony support of the spinal column is obtained.

Care must be taken to avoid all pressure on the windpipe, or the patient will be suffocated. For this reason it is not possible to apply a tourniquet or bandage to the neck with sufficient force to arrest the hæmorrhage from so large a vessel. It is impossible to maintain the requisite pressure with the finger for many minutes, and if surgical assistance is not at once forthcoming, the only plan is to have a relay of assistants who can continue the pressure in turn. In changing hands the pressure should be applied on the course of the artery below the wound—that is, between it and the heart.

Bleeding from the *armpit* and *upper arm* * may be arrested by compression of the subclavian artery or by direct pressure in the armpit.

From the Armpit and Upper Arm.

In compressing the subclavian artery, the right hand must be used for the left artery and the left hand for the right. Stand on the injured side of the patient, bare his neck and shoulder, lower the shoulder as much as possible by pressing his arm against his body. Next grasp the neck in the hand, by pushing the thumb down into the hollow behind the collarbone at about its centre and the fingers at the back. Apply the pressure with the thumb deeply downwards and backwards on the artery as it crosses the first rib. This is an easy proceeding in thin persons, but in stout persons is difficult, and it may then be better to use the handle of a large key, well covered with something soft.

If properly carried out, this method will arrest all flow through the artery, and will stop the circulation through the arm, which can be tested by finding if the pulse is absent from the wrist.

If there is a wound in the armpit hæmorrhage is often severe, for there are many and large arteries in this situation. Direct pressure is carried out by rolling up a firm pad the size of an orange, pressing it well into the hollow under the arm, and fixing it with a bandage. The centre of the bandage should be placed over the pad, the ends then carried up and crossed over the shoulder, pulled up firmly, and carried across the back and chest to the opposite armpit, where they are tied. The arm is then bound to the side by a broad bandage, encircling the lower part of the arm and body. If the hæmorrhage continues, compress the subclavian artery.

For a wound in the *lower arm* and *elbow* pressure must be applied to the wound or to the brachial artery in the usual way. The brachial artery is easily felt, as it is quite superficial throughout its whole length. It may be compressed by the fingers as follows: Stand at the side

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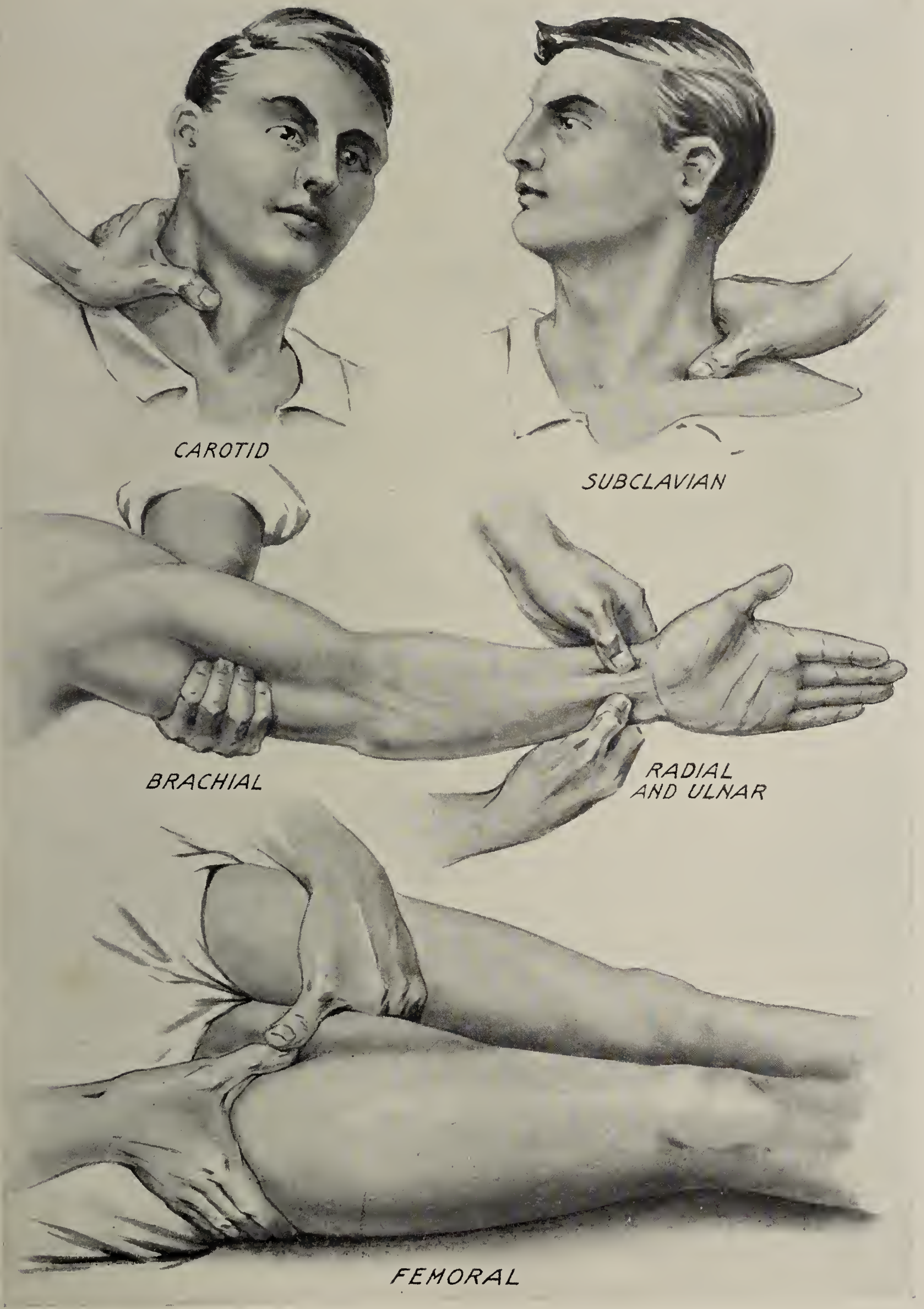
* Anatomically, the *arm* extends from the shoulder to the elbow, the *fore-arm* from the elbow to the wrist.



DIGITAL COMPRESSION OF VARIOUS ARTERIES.

of the patient, place his arm out straight with the palm upwards, and grasp it from the back, bringing the ends (not the tips) of the fingers over the artery. Or stand in front, grasp the arm with the thumb on its inner side, and press the thumb over the artery. The point of chief importance is that the artery be pressed against the bone. A bandage with a knot in its centre, which is placed over the artery, makes an efficient tourniquet for this vessel, and does not require very great pressure to prevent the circulation through it and stop the pulse at the wrist.

From the Lower Arm and Elbow.

Bleeding from the *forearm* may be treated with a pad over the wound and a firm bandage, by compressing the brachial artery, or by bending the elbow-joint. For the latter method, a pad should be placed in the bend of the elbow, and the forearm should then be firmly pressed up against the arm and fixed in this position with a bandage passed first round the wrist and then round the arm.

From the Forearm.

Bleeding from the *hand* can be controlled by pressure of both radial and ulnar arteries at the wrist, about 1 inch above the joint. This is applied by grasping the wrist with both hands, with the thumbs over the site of the arteries. For the thumbs may be substituted small oblong pads, which are placed over the vessels and fixed in position with a tight bandage passed two or three times round the wrist. The freest bleeding occurs in wounds of the palm, by which the palmar arch is cut. It may be checked at once by pressure in the wound with the thumb, or, what is better, by a graduated compress. This is made by first placing a small pad of lint over the wound, covering this with a second and larger piece, and then a third and fourth, each piece being rather larger than the one beneath, until a thick cone-shaped pad is formed. A tight bandage is then bound round the whole, and can be made to exercise very firm pressure.

From the Hand.

Another method of treating bleeding from the palm is to place a pad of lint containing a slice of cork or a small coin, or a round piece of wood covered with soft material, on the bleeding point, then closing the fingers over it, and tying the triangular hand bandage or the roller bandage tightly round the whole. The arm should then be supported in an arm sling.

Bleeding from the thigh may be treated by a pad and bandage or by compression of the femoral artery at the point where it passes over the haunchbone, at the centre of the groin. The limb is grasped with the two hands, the thumbs one upon the other are placed on the artery, and the fingers at the back produce counter-pressure. A tourniquet may also be placed round the thigh with the knot or pad in the course of the artery. The flow of blood through this vessel is also stopped by bending up the thigh against the abdomen, and fixing it in this position with a bandage passed round both the thigh and the body.

From the Thigh.

Bleeding from the leg should be treated in the first instance with a pad and bandage over the wound. If this fail, a pad about the size of a hen's egg should be placed in the hollow of the knee, and the leg then bent up against the thigh and fixed in that position with a bandage. Bleeding from the popliteal artery in the ham should be treated in a similar way.

From the Leg and Foot.

Bleeding from the foot may occur from the sole, and should then be controlled by a pad and bandage, by a carefully graduated compress, or by pressure of the artery with the fingers, placed just below the inner ankle. If these measures fail, the pad should be placed under the knee, and the leg firmly bent up and tied to the thigh.

If the bleeding be from the front of the foot a pad should be placed over the wound or over the large artery which passes over the ankle-joint from the leg. This vessel lies between the skin and the bones of the tarsus, and the circulation through it can easily be arrested by pressure.

EPITOME OF THE TREATMENT OF BLEEDING

1. Apply pressure immediately with the finger to the bleeding point, until a pad and bandage are ready.
2. Place a pad over the wound and fix it with a firm bandage.
3. Raise the part; remove anything that obstructs the circulation.
4. If bleeding continues and is arterial, apply pressure to the artery nearer the heart. If it continues and is venous, apply pressure to the vein farther from the heart.

CHAPTER LXX

UNCONSCIOUSNESS

Preliminary Treatment—Causes—Examination to Discover Cause—Fainting—Hysteria—Malingering—Shock or Collapse—Sun-stroke or Heat-stroke—Epilepsy—Apoplexy—Concussion—Compression—Suffocation—Intoxication—Opium Poisoning—Poisoning by Gases—Uræmia—Drowning—Artificial Respiration.

In the course of our first-aid experiences, we are exceedingly likely to be called upon to treat a person who is suffering from unconsciousness, for this is a very frequent symptom in connection with sudden illness and accidents. It will be impossible to treat the condition intelligently without recognising its cause, and yet it is produced by a great variety of states, some of which are due to disease, others to accident; some of serious import and likely to end fatally, others unimportant and transient. This chapter will therefore be occupied with a description of the various causes of loss of consciousness, the signs by which they may be distinguished from one another, and the proper treatment to be employed for each of them. If, in dealing with one condition, we by mistake employ treatment suited to another, we may do more harm than good. For example, stimulants are quite correctly given for an attack of faintness, but will do great harm in apoplexy, yet the most marked symptom produced by both is insensibility.

Preliminary Treatment in all Cases.

To begin with, place the patient on the back, or in the position most easy for the breathing. Loosen anything tight about the throat, chest, and abdomen, such as collar, braces, belts, or stays. Then make a rapid examination of the whole body to discover any wounds, broken bones, or bleeding. If these are found, arrest the hæmorrhage at once if at all severe, as elsewhere described (p. 285), and commit the care of the injured part to an assistant for treatment, keeping it in mind during your further examination. If there is no injury, raise the patient gently and lay him on a bed or couch, if such is at hand; support the head, keeping it low if the face is pale, but slightly raised if it is flushed. Prevent all crowding round of spectators, and provide plenty of fresh air. Then proceed to make a careful examination to discover if possible the cause of the unconsciousness. If this cannot be found, do nothing further until the doctor arrives. He should have been sent for at once, as unconsciousness is a symptom serious enough in itself to require his advice.

It is of particular importance to give nothing by the mouth to an unconscious patient, for it is exceedingly likely to choke him.

CAUSES OF UNCONSCIOUSNESS

Fainting.
Hysteria.
Malingering.
Shock or Collapse.
Sunstroke.
Epilepsy.
Apoplexy.
Concussion.
Compression.
Suffocation.
Intoxication.
Opium poisoning.
Poisoning by gases.
Uræmia.
Drowning.

Examination of Unconscious Person.

With the foregoing list of possible causes of unconsciousness in our mind, a systematic examination of the patient must be made, the various parts of the body being inspected with the idea of proving them unaffected, or of discovering some definite symptoms which will guide us in our treatment. We must first notice the patient's *general appearance.* If the face is pale and cold, it points to the presence of faintness, stunning or shock; if it is congested and blue, these affections are unlikely, and we must think of apoplexy, suffocation or drunkenness.

We next proceed to feel the *pulse* at the wrist, and this must be done with care, as unprofessional persons are not accustomed to making the observation, and may cause themselves needless alarm when doing it in a hurry. If the pulse is very weak, so that it can hardly be felt, it shows failure of the heart's action, which occurs in faintness, shock, and concussion. If it is full and bounding, it puts these conditions quite out of the question, and indicates apoplexy or malingering.

In observing the *breathing*, it is easy to distinguish the noisy, laboured breaths drawn by the epileptic, the apoplectic, and the intoxicated, from the shallow, almost insensible respiration of the faint and collapsed.

The *head* should next be examined for signs. Wounds point to concussion, bleeding from the nose and ears to fractured skull; blood-stained foam on the lips to the bitten tongue of epilepsy; marks and stains about the lips to some caustic poison. The inside of the mouth should be examined, for foreign bodies in the throat may cause suffocation, and a bitten tongue will show the source of hæmorrhage.

The *eye* should next be inspected. Lift up the lid and gently touch the sensitive transparent part. If the eye is instantly shut and the head moved, consciousness is not entirely lost. This may mean hysteria, or a mild form of some other condition, or it may point to malingering; but it shows that the patient is not completely insensible, for there would then be no sign of suffering.

At the same time, the *pupils* should receive particular notice. In extreme unconsciousness they do not react to light—that is, they do not change in size when, after being covered, they are exposed to light. In deep insensibility they are both larger than natural; in opium poisoning they are both very small—pin-point, as they are called; whilst in apoplexy they are often unequal, one large and the other small.

In the course of the inquiry the *smell of the breath* should receive attention. There may be the heavy odour of alcohol in the intoxicated, the smell of opium in the poisoned, the smell of urine in those suffering from uræmic coma.

The *muscular movements* exhibited by the patient may be some guide to us. If one side is moved and the other is kept perfectly still, the unconsciousness may be due to paralysis and point to apoplexy. If convulsive movements occur epilepsy may produce them, or hysteria, uræmia, or some convulsive poison.

Having come to some conclusion as to the probable cause of unconsciousness, treatment should be applied in accordance with the directions now to be given.

FAINTING

This may be brought on by emotional causes—fear, fright, or even sudden joy, or it may be due to exhaustion from fatigue, starvation, severe hæmorrhage, badly ventilated rooms, or exposure to extreme cold. It is sometimes a symptom of organic heart disease. The patient, more often a female, becomes suddenly pale, feels sick and giddy, and sinks down gradually in an insensible condition. On examination the face is pale and perspiring, the pulse weak and hardly perceptible, and the limbs limp and powerless. The eyelids are half open and the lips parted. If she be left alone, the colour usually soon returns to the cheeks, the breathing grows deeper and sighing, the eyes open, and consciousness is restored.

Treatment.

To restore the senses we must restore the circulation through the brain, and for this purpose the head must be placed low, either by laying the patient flat on the ground, or, if this is difficult from want of space, by pressing her head between her knees whilst she is sitting, and keeping it there for some seconds. All tight clothing must be loosened round the neck, chest, and even the abdomen. The circulation must be stimulated by sprinkling cold water on the face, slapping the hands, applying smelling salts to the nostrils, and, when the patient has sufficiently recovered to swallow, giving some sal volatile or spirits and water. The recumbent position should be maintained until consciousness has been quite recovered, or a return of the faintness will occur. Threatened attacks may be prevented by bending well forward, as if to pick up something from the ground.

HYSTERIA

A fit of hysterics is the most characteristic sign of a weakened or overstrained nervous system. It is seldom met with except amongst women. The attack is brought on by some emotional disturbance, fright, fatigue, or nervous exhaustion, the otherwise healthy patient being suddenly seized with an overpowering tendency to cry, scream, or throw herself about in strange contortions. " Hysterics " are not pretence or sham, but for all that they must be treated quite differently from other forms of convulsions. They are distinguished from epileptic convulsions quite easily, the patient's flushed, tearful face, panting breath, emotional laughter and sobs being quite unlike the alarming state of an epileptic. The loss of consciousness is only partial, and almost appears indeed feigned, for although apparently profoundly unconscious, the patient is evidently influenced by what is being done around her ; she would strongly object to having her hair cut, or her clothes spoilt by water, grows worse with unreasoning sympathy, and better with firmness and when treated as if nothing serious was amiss with her.

These facts must serve as a guide in treatment. Lay the patient down, splash her face with water, and suggest that if she does not soon improve it will be applied more lavishly. Make her comfortable and leave her alone for a time, and be careful not to show sympathy too early, or the symptoms will with a certainty return with increased energy.

Treatment.

MALINGERING

We meet with all sorts and conditions of men and women in our first-aid attentions, and must not, therefore, reject the idea of feigned unconsciousness when treating a stranger in public. There may be something to be gained by assuming a state of insensibility and severe illness, even though it may be only a drink and a coin from a sympathetic and earnest first-aid worker. If the eyelid of the person be raised and the cornea touched it will cause flinching from the pain, a proof that sensation is not lost. The pulse, breathing, the body generally shows no sign of disease, and the treatment will therefore depend more on the mental condition of the helper than on the patient, though care must, of course, be taken not to treat real illness as if it were feigned. Some cases are reported of beggars who have feigned epileptic fits so accurately as to deceive even the observant. By placing a piece of soap in the mouth they can imitate the froth on the lips, and by holding the breath may produce a blue and dusky condition of the face.

SHOCK OR COLLAPSE

This condition follows severe wounds or other injuries, and is due partly to the severity of the injury—especially if it involves a vital organ—and partly to the pain, fear, and loss of blood, which accompany it. Though copious hæmorrhage produces shock, the condition may occur without the loss of any blood. The symptoms are severe faintness, with slow, weak, almost imperceptible pulse ; rapid, gasping breathing ; face and lips white and bloodless ; skin bathed in a cold, clammy perspiration. The patient is half conscious—that is, he can be aroused and answers rationally, but sinks back into unconsciousness at once. Although he can speak and relate details of his accident, he seems unconscious of pain, and will look on without flinching whilst the most painful injuries are attended to. The condition may be slight, and there may be quick recovery ; or it may be so severe as to be but little removed from death.

The treatment depends on the severity of the symptoms. The patient should be kept absolutely flat, with the head low. As soon as possible, he should be put to bed, between blankets, and his body thoroughly warmed with hot bottles. The feet and legs should be

First Aid.

well rubbed, and the heart stirred to action with a mustard plaster placed over it. As soon as the patient can swallow, a small quantity of sal volatile or alcoholic stimulant with hot water should be given, but on no consideration should this be given if the shock is caused by bleeding, or the hæmorrhage will be re-started and probably cause death. In extreme cases the head should be lowered, the limbs raised, and artificial respiration employed, for both heart and lungs are threatening to stop. Injections of brandy and water or other stimulants may be given by enema into the bowel. As soon as improvement occurs, the stimulant treatment should be stopped, or inflammatory reaction will set in. Absolute rest and warmth will complete the cure.

SUN-STROKE OR HEAT-STROKE

In milder cases of this condition the patient feels faint and exhausted, with headache, giddiness, and sickness ; in the more severe cases he may become completely unconscious and helpless, with flushed face, rapid pulse, and shallow, sighing breathing.

The treatment consists of cold and rest. Carry the patient to the coolest place available—wherever there is shade—loosen his clothing, fan

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his face and head, keep him lying down, and pour cold water over his face, head, and neck. In severe cases the whole body should have cold applied to it by means of a sheet wrung out of cold water, and ice should be applied to the head and spine. The thirst may be relieved when the patient is conscious with drinks of cold water, and the faintness with stimulants, such as sal volatile or brandy well diluted. (For fuller particulars, *see* Vol. II., p. 199.)

EPILEPSY

An epileptic fit comes on suddenly in an apparently healthy person, most often a young adult. He utters a cry and falls to the ground unconscious. The face and body are affected with violent convulsive movements, during which the tongue is often bitten, and respiration ceases. The face grows dusky and blue, and bloodstained froth collects on his lips. The convulsion soon passes off, and he either seems himself again or falls into a heavy sleep. During the various stages of the fit injury is likely to be received, first of all in the sudden fall. The patient may strike against some hard object and wound himself, or he may fall in the fire and receive burns, while during the convulsive movements he may come into violent contact with things around, and may bite his tongue.

First Aid.

The treatment must be chiefly directed to preventing those injuries. The patient should be placed as far as possible away from a wall or articles of furniture, and his movements should be restrained, but without using much force. A piece of wood, cork, pencil, or the like, wrapped in a handkerchief, must be placed between the teeth to prevent the tongue from being bitten. The head should be raised and the clothing about the throat and chest loosened. Nothing must be given by the mouth until consciousness has been completely restored, and after the fit either let the patient have his sleep out or hand him over to a friend to see him safely home. His is not a condition in which he should be left to his own devices, for curious mental states not unfrequently follow epileptic convulsions. Epilepsy in general has already been described (Vol. I., p. 357).

APOPLEXY

It has been previously explained (Vol. I., p. 353) that a stroke of apoplexy is caused by a vessel giving way and pouring out blood on the surface of the brain or into its substance. The blood collects on the surface and causes compression of the brain, or in its substance, and destroys some portion of it. The symptoms, as a rule, come on quite suddenly, although certain premonitory threatenings may have existed for some days previously, and have been disregarded. On examination the patient is found to be elderly (for the young are seldom affected), and usually full-blooded. He has been suddenly attacked whilst walking or making some slight effort, and was seen to stagger and fall down. If seen at once after being attacked he may be partially conscious, and answer questions when shouted at. But insensibility becomes gradually deeper, so that nothing will arouse him. He lies apparently quite helpless, with a flushed face, a hot, perspiring skin, and often with high temperature. His breathing is laboured and noisy, each breath being accompanied with a loud snoring noise called stertor, which is due to paralysis of the palate, and the cheeks are drawn in and puffed out. His pulse is slow and full, and the pupils are unequal in size, one being enlarged and the other normal. One side of the body will be paralysed and will not be found to move: either the leg or the arm, or perhaps both, will be limp and helpless, and will fall like a dead weight. The paralysis is on the opposite side to the hæmorrhage—that is, if the right side of the brain is affected the left side of the body is paralysed, and vice versa.

Apoplexy is very dangerous, and a doctor should be sent for immediately. In the meantime, place the patient on his back, with his head raised, undo all tight clothing around his neck, chest, and abdomen, give him plenty of fresh air, apply cold to his head by cloths wrung out of cold water, place hot bottles to his feet and a mustard poultice to the calves of his legs. Lastly, give him nothing to drink—neither spirits, sal volatile, nor even water—for fear of choking him. It is of great importance to remember how difficult it often is to distinguish apoplexy from intoxication, and to how serious a result such a mistake may lead. Many an apoplectic patient who smells of drink has been treated as if drunk, and the hæmorrhage seriously increased. An emetic, or attempts to rouse one suffering from an apoplectic fit, will do great harm. The points of distinction are considered under Intoxication (p. 306).

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CONCUSSION

Stunning, or concussion of the brain, is produced by a violent shake of this organ, either by a blow on the head or by falling from a height on to the feet. The symptoms vary according to the severity of the shake. In slight cases there is but passing giddiness and confusion of thought, whilst in severe ones the patient is apparently unconscious. However, if he is spoken to loudly he can be got to answer questions, but immediately passes into the semi-conscious state again. The face is pale, the breathing slow, the pulse weak, and the eyes shut. If the pupils are examined they may not react to light, but are equal in size. In most cases the patient vomits, and then gradually recovers his senses.

The treatment consists in keeping the patient quiet and at rest in the recumbent position, with his head raised. Unfasten any tight clothing, apply warmth to the hands and feet, and if he is sufficiently conscious to swallow, give some warm drink, such as tea or coffee. The accident which produces the stun-

First Aid.

ning may have been sufficiently severe to cause tearing of the substance of the brain and hæmorrhage, when symptoms of compression and of apoplexy may supervene.

COMPRESSION

Compression of the brain may follow a head injury immediately or in the course of a short time. In the first case, it is due to a fracture of the bones of the skull and a depression of the broken fragments which press on the brain ; in the more remote cases some blood-vessel is wounded, and the blood which is poured out gradually collects and compresses the brain substance. The unconsciousness may be partial or complete, according to the amount of brain injury, and the symptoms are similar to those of apoplexy, in which the hæmorrhage is due to the rupture of a diseased vessel. A wound of the scalp is present with signs of a fractured skull (p. 259); the patient lies semi-conscious, with heavy, noisy breathing, a slow, full pulse, and unequal pupils.

Treatment.

The treatment recommended for apoplexy must be adopted; the wound must be washed and dressed after all bleeding has been stopped. In such cases the operation of trephining, or removing the depressed portion of bone, often gives relief to the symptoms we have described.

SUFFOCATION

Suffocation is an interference with the breathing, caused by some form of obstruction of the air passages. It may result from the presence of food or some foreign body in the windpipe (p. 218), from pressure upon the outside of the neck from an assailant's hands, or a cord applied with suicidal intent, when it is termed strangulation. Suffocation is a common cause of death amongst the infants of the poor who share the same bed as their parents and are overlaid. A similar condition sometimes results from pressure on the chest in a crowd, or from a weight falling on the body. It may also be caused by the inhalation of poisonous gases and by drowning, both of which conditions are described separately.

When the breathing is arrested in any of these ways, the body ceases to be supplied with oxygen, and its impurities are not discharged from the blood. The veins become full of blood, the heart, overburdened, ceases to act, and death supervenes. The suffocated person has a blue and swollen appearance.

The first thing to do—and to do without delay—is to remove the cause of the obstruction. The foreign body should be extracted from the air passages, or the constricting cord removed. Artificial respiration should then be carried out, and warmth and stimulants employed. If artificial respiration can be started before the action of the heart is stopped, there is every hope of saving life.

Treatment.

INTOXICATION

Acute poisoning with alcohol has already been described (Vol. II., p. 222). It will be necessary here to show how the condition is to be recognised and distinguished from other affections which show similar symptoms. A drunken person is not completely insensible, except in very extreme cases. The eye is sensitive to pain if touched, and by shouting some reply may be elicited, both of which signs are absent from apoplexy and from opium poisoning. The pupils are larger than natural in drink, unequal in apoplexy, and very small in opium poisoning. Alcohol causes no paralysis, and if a limb be moved some resistance will be exerted, which contrasts with the one-sided paralysis of apoplexy and the absolute flaccidity of the affected limb. In alcohol poisoning the face is pale and the pulse weak; in apoplexy the countenance is congested and the pulse strong. In intoxication the breath smells unmistakably of drink, but a mistake must not be made in assuming that everyone who smells of drink is drunk, for the first thing many a person does when feeling ill is to take stimulants; or the drink may have been administered by someone by way of treatment. If the smell of drink is absent, however, it is certain that intoxication does not explain the condition.

Deep unconsciousness produced by alcohol is a dangerous state, and requires careful treatment. In the milder cases it is best to put the patient in a comfortable place—bed for preference—cover him up warmly, and let him sleep himself sober again. If it is known that a large quantity of drink has been recently taken, an emetic should be given if unconsciousness is not too deep to allow of it—either two tablespoonfuls of salt or a tablespoonful of mustard in a tumblerful of water. When this has emptied the stomach, give a cupful of strong hot coffee, tea, or beef tea. When unconsciousness is very deep, the breathing stertorous, and the pulse very feeble, the patient must be roused—by splashing cold water over his head,

Treatment.

by shaking him, or even by using an electric battery. He should have hot bottles placed to his feet and be kept from exposure to cold, as dangerous consequences are likely to follow such exposure in this condition.

The difficulties just suggested in the diagnosis make it wisest in cases which still remain doubtful to treat the patient as for apoplexy.

OPIUM POISONING

This may be the result of accidentally or suicidally taking a large dose of some preparation of opium—laudanum, paregoric, "black-drop," "Godfrey's elixir," "Dalby's carminative," "Battley's solution," chlorodyne, nepenthe, syrup of poppies, children's soothing syrups, etc.—or by eating or smoking opium. The first symptom produced by opium is some excitement of the brain, then headache, weariness, sleep, and total unconsciousness. At first, by constant stimulation, it is possible to keep the patient from giving way to sleep, but as the drug is absorbed the tendency becomes overpowering, and the patient sinks into a comatose state, even whilst being walked about. A characteristic sign of opium poisoning is very contracted pupils—"pin point," as they are called—which do not react to light. When insensibility is complete the patient lies helpless, with pale and livid countenance, he is bathed with cold, clammy sweat, the breathing is slow and stertorous, the pulse is rapid and weak, and the breath has the peculiar smell of opium or poppyheads.

First Aid.

Immediately on recognising the cause of the patient's condition —and this may be aided by discovering a bottle which has contained the poison—we must give an emetic, two tablespoonfuls of salt or a tablespoonful of mustard in a tumblerful of warm water; or, failing these, plentiful drinks of warm water, or pass the finger or a feather down the throat. Having made the patient vomit, our second aim must be to prevent him from going to sleep. This we must do by every means in our power, for sleep may be the sleep of death. We must get assistance and walk him up and down continuously, for preference in the open air, or we may smack him on the back, chest, face, anywhere, with a wet towel, and throw cold water over his face, or use an electric battery. Strong black coffee is a good stimulant, and may be given freely; and a very pale solution of permanganate of potash or Condy's fluid may be swallowed as an antidote. All other means failing, we must employ artificial respiration.

POISONING BY GASES

This form of unconsciousness may be met with under many circumstances. Carbonic acid gas, although not a poison, will cause insensibility if it collects in large amounts in the air. It occurs where large numbers of people are crowded together in a small room into which no fresh oxygen can find entrance. The gas of burning charcoal or of coke (carbonic oxide) is a dangerous poison, and is often used as a means of committing suicide by lighting a fire in a sealed-up room. Ordinary coal gas also is the cause of many deaths, through the accidental turning on of the gas in the bedroom when retiring to bed. The gas which collects in sewers (sulphuretted hydrogen), and the choke-damp which follows explosions in mines, are both very fatal poisons. The vapours of chloroform and ether, if inhaled to excess, act similarly.

Many lives are also lost by suffocation with smoke in a burning room. The means of rescuing a person from a room full of smoke have been described (p. 232). To enter a room full of charcoal smoke the mouth should be covered with a handkerchief soaked in vinegar and water, and the window should be broken immediately to admit fresh air. The same measures should be employed in connection with coal gas, especial care being taken to avoid any naked light, which would cause an explosion.

A person suffering from any of these poisons is insensible, with face pale or blue and covered with perspiration. The tongue is swollen and often protrudes from the mouth, the hands are clenched, the breathing is carried on with difficulty.

First Aid.

Carry the patient at once into the fresh air, loosen any tight clothes which impede the breathing, and stimulate the respiratory organs by dashing cold water over the face and chest and slapping the same parts with a wet towel. If breathing is not rapidly re-established start artificial respiration.

URÆMIA

Is a result of some disease of the kidneys, which fail in their duty of removing waste material from the body. The waste products therefore collect in excessive amount, and are liable to set up violent convulsions accompanied with insensibility. The breath often has a peculiar urinous smell, and if the feet are examined they will generally be found to be swollen, and to "pit" when pressed with the finger.

The case should be placed in the hands of a doctor at once, but in the meantime the patient must be put to bed immediately, between the blankets. Hot bottles must be applied to the feet, cold to the head, and a large hot poultice to the loins, and a good purgative dose of Epsom salts should be given.

First Aid.

DROWNING

The restoration of the apparently drowned is pre-eminently a subject upon which those interested in first aid should make themselves well informed. The measures required must be carried out immediately and on the spot, and there is no time to spare to send for medical assistance. Neither is it necessary to inquire into symptoms; the patient has been pulled out of the water and is apparently lifeless, but by immediate treatment many a life is saved. The important fact to remember is that even after breathing has entirely ceased the heart may continue to act, even though, it may be, but feebly, and that as long as it continues—and perhaps even for a brief period after it has ceased—the right treatment, energetically carried out, may start respiration again and restore the patient to life. Persons have recovered in this way after two minutes of total submersion in the water, and some after five minutes, or even longer. If the person has fallen into the water after being stunned or in a fainting condition, there is a chance of recovery after even a longer immersion, for the respiratory movements may then have ceased or been very much reduced, and the amount of water taken into the lungs will be much diminished.

In cases of drowning there are many causes which combine to render the patient unconscious and apparently lifeless. First, there is often great shock to the nervous system; then there are the effects of long exposure to cold and also intense exhaustion from the violent struggles in the water to reach a place of safety or keep afloat. But the chief agent in producing suffocation and causing loss of consciousness is the entrance of water into the air passages. A drowning person may sink and rise again to the surface several times, and whilst he retains his presence of mind, or even remains conscious, he takes a breath only when at the surface, but soon unconsciousness sets in, and the action of breathing takes place under the water, the air passages become full of water and dirt, and so breathing is completely prevented. Much water also passes into the stomach, but this is not important, for it will probably be vomited when the patient recovers. It must, however, be remembered during the process of treatment, for if the patient be raised up and his head much lowered the water may run out of the stomach into the throat, and increase the patient's danger by passing into the air passages.

First Aid.

To restore the apparently drowned, in whom respiration has ceased, treatment should be started without a moment's delay, even to make an examination as to the presence of injuries, or to find out if the heart is still acting. Send at once for a doctor, blankets, and other necessaries. The first step in treatment is to clear out water, dirt, and froth from the air passages. To do this, loosen the clothing round the neck and chest as freely as possible; wrap a handkerchief round the finger, open the patient's mouth, and wipe out, with the finger passed well back into the throat, all dirt and froth. Then employ the method of artificial respiration devised by Dr. Marshall Hall, as follows: Place a roll of clothing on the ground to protect the chest, turn the patient over on to his face with his forehead resting on his right forearm, bent up for the purpose. Place the hands on the back of the chest over the lower ribs and compress firmly for a few seconds. Then turn his body on to the right side by catching hold of the shoulder and hip, and let it rest in that position for a few seconds. These movements must be repeated until water and froth cease to run from the mouth. The procedure expands and contracts the chest alternately, and besides emptying the air passages of water, may promote the breathing movements. The patient should then be turned flat on his back with the clothes rolled up in a heap under his shoulders, and Sylvester's or Schäfer's method of artificial respiration employed.

As soon as the breathing has become well established by these means, the movements may be discontinued, a careful watch being kept lest respiration should again cease, and our efforts should be directed to promoting the warmth of the body and stimulating the circulation. The limbs should be well rubbed with the hands or with dry cloths, and if hot bottles and blankets have arrived they should be placed about the body. Dry clothes may next be put on, and as soon as the patient can swallow he may have some hot coffee or brandy and water; or if he is unable to swallow, these may be injected into the bowel as an enema. The efforts to re-establish the breathing should be carried out regularly and continuously and persisted in for an hour or two before giving up hope of saving the patient's life.

After the breathing is again performed in a natural manner it is necessary to make a careful examination of the body to see that no wounds, fractures, or other injuries are present and require treatment. The transport of the patient will next engage our attention. He must be carried home with great care, a watch being kept over his breathing. As soon as his home is reached it is a good plan, whilst a well warmed bed is being prepared, to place him in a hot bath, the temperature of which should be as high as can be well borne. He should be kept in this but a few minutes, then rubbed over well and rapidly with hot towels and put to bed between blankets, with hot bottles placed about his body. A warm drink may also be given, and will assist in warming the body and in encouraging a free perspiration. In this way may be averted the great danger of pneumonia and other complications which are so likely to follow a prolonged exposure to severe cold.

ARTIFICIAL RESPIRATION

The employment of artificial respiration may be required in all cases in which the natural respiratory movements have ceased, whatever may be the cause. It may be called for in the many forms of suffocation, due to obstruction of the respiration by particles of food or foreign bodies in the air passages, or to the inhalation of poisonous fumes or gases, such as carbonic acid, charcoal fumes (carbonic oxide), coal-gas, or the various anæsthetics, especially chloroform and ether. It may be required in cases of strangulation, whether caused by hanging, garrotting, or a tight band round the throat. Lastly, it may have to be resorted to in order to re-establish the breathing in those who have been rescued from drowning.

The methods we shall describe, each of which may be useful under different circumstances or in combination with others, are Dr. Sylvester's, Dr. Benjamin Howard's, Mr. Laborde's, and Mr. Schäfer's.

In all alike, the first step of the treatment should be to see that the air passages are free from obstruction, so that the air may enter the lungs without difficulty. Foreign bodies and portions of food must be removed with the finger; water, dirt, and froth must be wiped out with a cloth, and the water allowed to escape by putting the patient in an appropriate position. The tongue must be held out of the mouth if the patient is unconscious, or it will fall back into the throat and obstruct the upper opening of the windpipe. It may be drawn forward by an assistant, who holds it with the corner of a handkerchief between the finger and thumb, and if no assistant is available, by tying it forward with a piece of string, tape, or torn handkerchief, which should be placed in the mouth as far back as possible and tied firmly under the jaw. An elastic band is also suitable for the purpose.

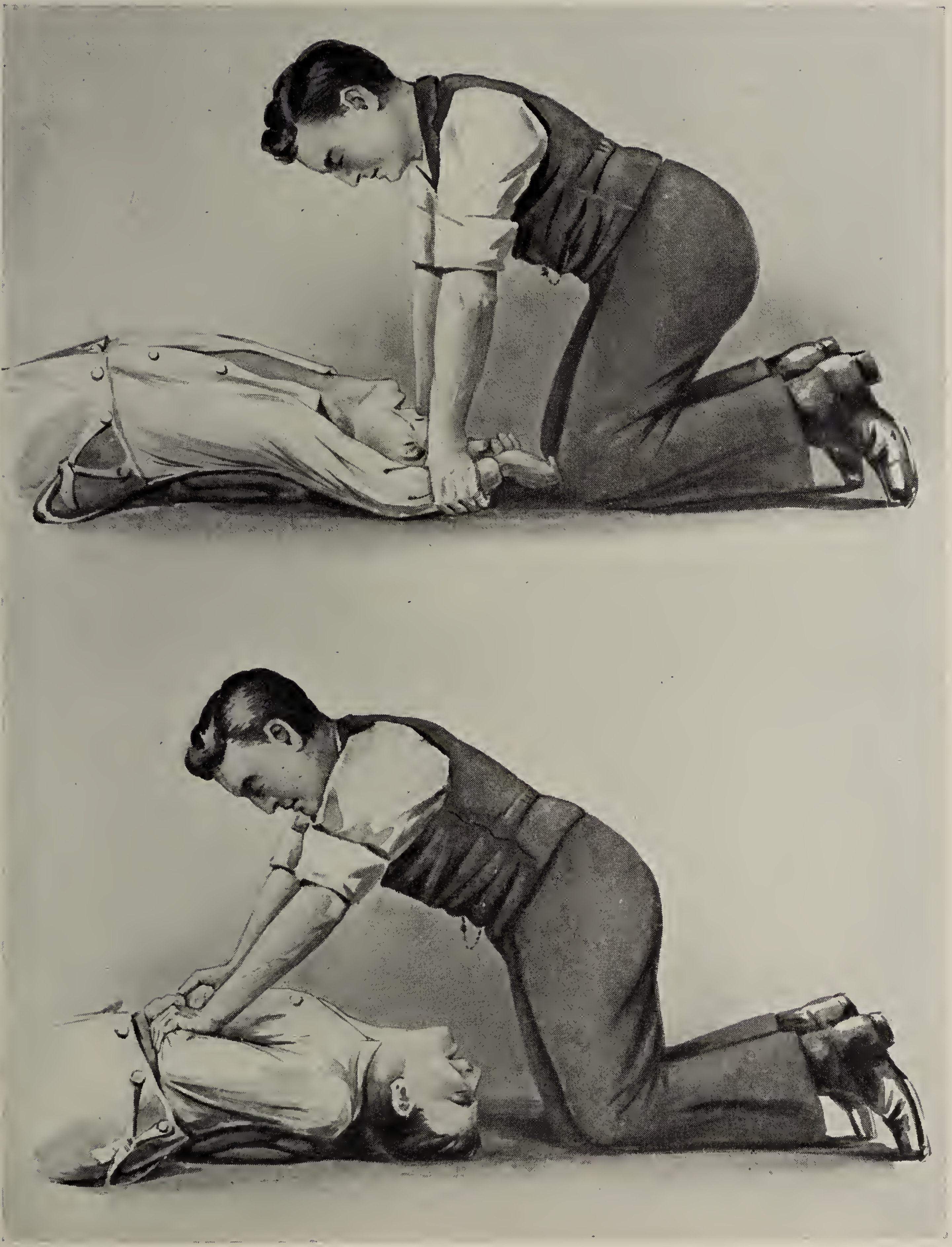
We have already described Dr. Marshall Hall's method (p. 310), and all that need be said of it further is that it is not so efficient a method as Dr. Sylvester's, but has the advantage of being easier for one person to perform unaided, especially if the patient be heavy and the operator weak. It also obviates the difficulty of dealing with the tongue, which keeps out of the way by its own weight.

Sylvester's Method.

In Sylvester's method the clothing from the chest is removed and anything tight round the abdomen unfastened, so as to give free play to the organs of respiration. Next clear the mouth and nostrils of all dirt and froth by wiping with a cloth wrapped round the finger, and if water has entered the air passages, allow it to run out by turning the patient face downwards and pressing on the back of his chest. No attempt should be made to empty the stomach of any water that has been swallowed. These preparations should be carried out with the greatest rapidity, and should take but a few moments, for time is of the utmost value.

The patient should then be laid on his back with his legs stretched out, and his shoulders well raised by a rolled-up coat or other garment. In this position the chest is thrown out, the neck extended, and the head thrown well back. If properly arranged, the tongue will not tend to fall back into the throat; the chin will also be well raised, and will not press upon the larynx and obstruct it. It is sometimes desirable, however, for an assistant to draw forward the tongue and hold it out of the mouth between his finger and thumb, which should be covered with a cloth to provide a good grip.

The operator should then kneel at the patient's head and take hold of both his forearms with his hands placed just below the elbows. The *first movement* is to carry the arms with a steady circular motion outwards and backwards over the head, as far as they will go. In this



SYLVESTER'S METHOD OF ARTIFICIAL RESPIRATION.

way the chest cavity will be enlarged and the process of inspiration is imitated, air being heard to pass into the lungs. A pause of a couple of seconds should be made in this position. The *second movement* is to carry the arms downwards again with a similar circular movement, until the two elbows are placed over the pit of the stomach. The operator then leans forwards and bears his weight forcibly on the arms, pressing them upon the belly and the sides of the chest. This drives the diaphragm upwards and lowers the ribs, thus diminishing the size of the chest and driving the air out of it. Expiration is thus imitated, and a distinct grunt should be heard, caused by the air being forced out through the air passages; if this fails to occur, there is some doubt as to whether air has entered at all during the first movement. Another short pause should follow the second movement, and the whole process should then be repeated. It should be carried out slowly and regularly at about the rate of normal breathing, or from fifteen to seventeen times a minute, and should be continued until some natural efforts of respiration commence. Usually a few minutes of artificial respiration results in the patient giving short gasps, and the movements should then, if possible, be timed to assist these, the arms being stretched above the head with each gasp and pressed against the chest between them. The movements should then be gradually discontinued as the natural breaths become deeper, but the breathing must be carefully watched, and the movements recommenced if it tends to fail.

Accessory measures must be carried out by assistants. The feet may be dried and warmed, the legs well rubbed towards the body to encourage the flow of blood, and warm, dry clothing may be put on, but nothing must be allowed to interfere with the movements to restore the breathing, which are the essential part of the treatment.

This is the method most commonly employed, and when once understood is very simple. It is, however, very fatiguing, and cannot be carried on for very long at a time by the same person. If it has to be continued for an hour or more, as is sometimes found necessary, it requires several persons, who take the duty in turns of a few minutes' duration each, but no interval must be allowed to elapse between the turns.

In Howard's method the air passages are first freed from water by placing the patient on his face and pressing on the chest in the manner already described. He is then laid on his back, with a roll of clothing placed beneath him just below his shoulder-blades, so as to make his abdomen project forwards and his head hang well back. Place the hands above the head. Kneel astride the patient's thighs, bend up your arms, and fix your elbows firmly against your sides. Place your hands spread out over the lower part of the patient's chest on each side of the pit of the stomach; now lean forward until your mouth is nearly over the mouth of the patient, squeezing his two sides together by bringing all your weight to bear on him, as if you wished to force everything in the chest upward towards the mouth. Remain in this position for about three seconds. Then suddenly push yourself back with a final squeeze into the upright position on your knees. Rest about three seconds, and repeat the movements again and again with great regularity. In this way the air is forced out of the chest by the pressure, and is drawn into it by the elastic recoil of the chest walls. The movements should be repeated ten times a minute.

Howard's Method.

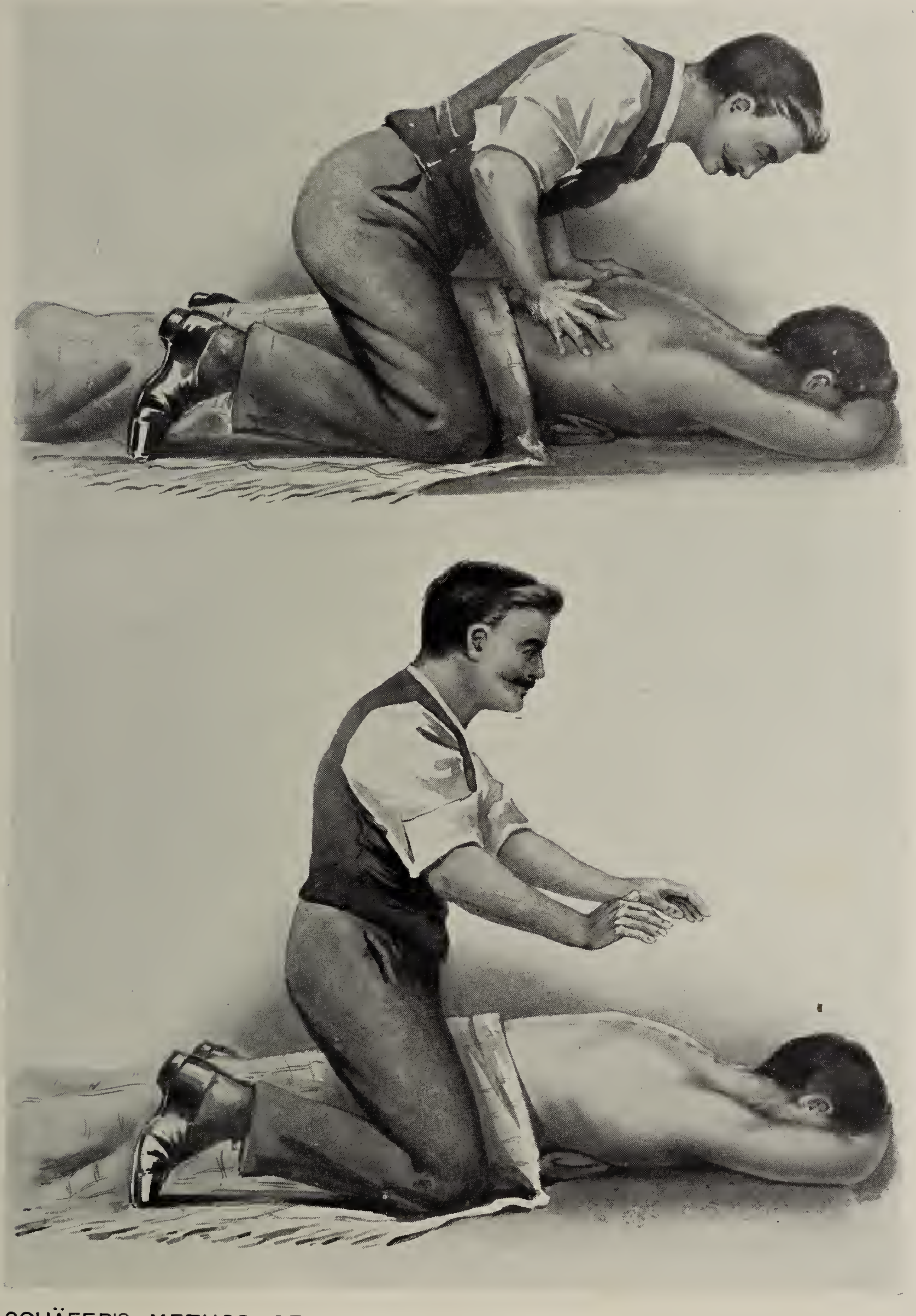
This method may be employed in conjunction with that of Sylvester, the pressure on the chest and abdomen being carried out at the same time. It can be adopted when the patient's arm is broken and Sylvester's is inapplicable. It can easily be carried out by one person, is not so exhausting as Sylvester's, and can therefore be continued for a much longer period.

Dr. Howard's method in a modified form may be used for young children. The spread-out hand is placed on the centre of the lower part of the chest and forcibly pressed on it, thus driving out the air. By releasing the pressure the elastic chest walls spring outwards, and the air is again drawn inwards.

Still another method has been recommended for children, or for adults whose ribs are broken and forbid the strong pressure required by the other systems. It is named Laborde's method. Whilst the patient lies on his back, the tongue is held between the finger and thumb covered with a cloth, and the lower jaw pressed open. The tongue is then drawn out of the mouth, held there for two or three seconds, and then allowed to fall back again. The procedure is repeated ten to fifteen times a minute.

Laborde's Method.

In very young children air may be driven into the lungs by applying the mouth directly to the child's, and blowing with all the force possible.



SCHÄFER'S METHOD OF ARTIFICIAL RESPIRATION.

Another method which has recently been recommended under the name of Schäfer's method is somewhat similar to Dr. Marshall Hall's.

Schäfer's Method.

The mouth having been wiped out, and all tight clothing loosened, place the patient on the ground, with his face downwards, the head resting on his bent-up arm, and with a rolled-up coat under the lower part of his chest. Kneel astride of the patient's body, facing his head, lay the hands with the fingers spread out over the lower part of the back of the chest, one on each side, then gradually bend forward your body, throwing your weight on his chest. In this way the air is forced out of the patient's chest by compressing the lower ribs. Next raise yourself slowly into a kneeling position, removing all pressure from the chest. The chest will now expand by its natural elasticity, and will draw air into the lungs. Repeat these two movements every four or five seconds regularly until natural movements of breathing are re-established.

This method can be carried out by one person. It is far less fatiguing than Dr. Sylvester's, and can therefore be continued without assistance for a long time. It also obviates the difficulty of holding the tongue forward, which is usually necessary when the patient is lying on his back. The changes of position required by the other methods are also avoided, and the air passages are thoroughly cleared of water.

CHAPTER LXXI

POISONS AND POISONING

Classification of Poisons—Poisons for which an Emetic should never be Given—Recognition of Poisons—How to Act in a Case of Poisoning—Rationale of Treatment—Emetics—List of Poisons, with Symptoms and Treatment—Chronic Poisoning.

A POISON may be taken into the body by accident, or with the intention of committing suicide, or may be administered murderously. That a poison has been taken may usually be surmised by the symptoms coming on suddenly, soon after taking food or drink, or after swallowing some substance unintentionally. Accidental poisoning may occur from mistaking some poisonous liniment for medicine, or from drinking some poisonous fluid under the impression that it is, say, water or milk, or from taking an overdose of a medicine containing poison.

Poisons are divided into three classes, according to their action—namely (1) irritants, (2) narcotics, (3) narcotic-irritants.

Classes of Poisons.

(1) Irritants cause vomiting, purging, and intense pain in the stomach. They injure or destroy the parts with which they come in contact, and cause inflammation and ulceration of the stomach and intestines.

(2) Narcotics act chiefly on the brain and nervous system. They cause paralysis, convulsions, deep sleep or stupor, and finally unconsciousness.

(3) Narcotic-irritants have a mixed action, cause both vomiting and purging by their action on the digestive organs, and unconsciousness and nervous symptoms by their effect on the brain.

A more useful division for first-aid purposes is according to the treatment that is necessary. These are (1) the **poisons for which an emetic should never be given**, and (2) the poisons for which an emetic should be given as soon as possible.

In the irritants are included all the corrosive poisons, which act as caustics and destroy the mucous membranes with which they come in contact; in the second class are placed all other poisons.

The chief corrosive poisons are the strong acids, the caustic alkalis, and certain caustic salts, one of the most active being corrosive sublimate.

Irritant Poisons.

Of other irritant poisons the most important are preparations of arsenic, antimony, zinc, and other metals; elaterium, gamboge, and colocynth amongst vegetable substances; and cantharides and food poisons belonging to the animal kingdom.

The symptoms of corrosive poisoning are marked and unmistakable.

1. Immediately after swallowing there is a caustic burning sensation, with severe pain in the mouth, throat, and stomach, the mucous membrane being burnt and destroyed. The pain rapidly spreads over the whole abdomen.

2. Intense thirst.

3. Vomiting setting in rapidly, at first of the ordinary contents of the stomach, but altered by the poison; later, of altered blood, dark or black, mixed with mucus and fragments of mucous membrane.

4. Constipation with acids; purging and straining with alkalis.

5. Difficulty in speaking and pain in swallowing.

6. Staining of the mouth, tongue, and skin about the angles of the mouth, and marks upon the clothing, which vary with the form of caustic taken.

(*a*) Nitric acid.—A yellow coating on the skin and mucous membrane, and yellow, orange, red, or brown stains on the clothing.

(*b*) Sulphuric acid.—The skin and mucous membrane are white at first, and as if covered with white paint, or charred to brown or black, and the clothes are a dirty brown with reddish edges.

(*c*) Hydrochloric acid.—The tissues are greyish-white or brown, and less thickly coated; the clothing is stained bright red.

(*d*) Oxalic acid.—The tissues are white or brown, and the stains on the clothes brownish or orange red.

7. Signs of extreme collapse. The face is pinched and blue; the skin clammy, white, and bathed in cold perspiration; the eyes are sunken

and wild, the pupils dilated; the pulse is rapid, weak and hardly perceptible, the breathing quick and difficult, the temperature very low, the intellect clear even to the last.

If recovery does not take place, perforation of the stomach may occur, and set up acute peritonitis, or death from exhaustion and shock may supervene in from twelve to twenty-four hours from the taking of the poison.

RECOGNITION OF POISONS

The first thing to do in connection with a case of poisoning is to discover what poison has been taken. If the patient is conscious, he can in most cases solve the difficulty. If he is unconscious, we must make a careful examination for ourselves. A quick look round should be made for any bottle that could have contained the poison. If found, examine the label ; then note the smell of its contents. Prussic acid, carbolic or other caustic acid, ammonia, and several other poisons can at once be recognised in this way. If the name of a neighbouring chemist be on the label, send a messenger at once to make inquiries. An examination of the patient, even though it be quite superficial and made by an unprofessional person, will give much guidance. If the lips and clothing are burnt, the poison is one of the corrosive class ; if there is unconsciousness, a narcotic has probably been taken. If vomiting has occurred, the material brought up may assist us by its appearance or smell.

HOW TO ACT IN A CASE OF POISONING

1. Send for the doctor at once, giving particulars of what has occurred.
2. Decide whether an emetic should be given.
   Do not give an emetic—
      (*a*) If the lips and mouth are stained and burnt.
      (*b*) If the patient is unconscious.
   In all other cases give an emetic at once.
3. In all cases if the patient can swallow—
   Give plenty of milk, raw eggs, oils, and strong tea or coffee, both before and after the emetic. In phosphorus poisoning, however, oils must not be given.
4. Treat the shock with warmth and stimulants. Do not let the patient go to sleep before the doctor's arrival.

RATIONALE OF TREATMENT

An emetic should not be given when corrosive poisons have been taken, because the stomach will be much burnt and injured, and the strain of vomiting is likely to tear through the stomach walls at some of the weakened spots, an accident which is almost certainly fatal. In these cases the right course is to administer some substance which will neutralise the poison, or render it harmless, and make no attempt to remove it from the stomach.

An emetic also should not be given to an unconscious patient, as both in swallowing it and in the subsequent vomiting the fluids are liable to pass into the air passages and suffocate him.

The proper way to treat an unconscious patient is to arouse him in any way possible. Shout at him, shake him, pour cold water over his head, or flick him with a wet towel. If his breathing is failing and tends to cease, use these stimulating measures, and if necessary employ artificial respiration.

Milk may be given as freely as possible in all cases of poisoning whilst the patient is conscious, for it has a decidedly beneficial effect. The curds which form in the stomach envelop the poison, and aid in carrying it out when vomiting is induced. Cream and flour may be beaten up together and given for a similar purpose. The white of beaten-up eggs also curdles, and is useful in the same way.

Oils are given because they are soothing to the stomach, and form a protective coating over its surface. Olive, salad, linseed, and cod-liver oil are all suitable, but the mineral oils are not.

Tea and coffee act as antidotes to many poisons, and are good stimulants. They should be given hot and strong, and can do no harm.

It is very important that everything that is brought up by vomiting in poison cases should be carefully preserved, to be shown to the doctor when he arrives, and, if necessary, to be analysed.

Having decided on the first step and given an emetic or not, according to the poison taken, we must come to some conclusion as to the precise nature of the substance swallowed, for it is necessary, as soon as possible, to give the antidote, if there is one. For this purpose the poison should be referred to in the alphabetical list which follows, and the measures there recommended should at once be put into practice.

LIST OF EMETICS

1. Mustard, a tablespoonful in a tumblerful of water.

2. Common salt, two tablespoonfuls in a tumblerful of tepid water.

3. Sulphate of zinc, 20 or 30 grains dissolved in half-tumblerful of water.

4. Ipecacuanha, half-teaspoonful of the powder in water, or one or two tablespoonfuls of the wine in water. (To a child a teaspoonful of ipecacuanha wine should be given, and repeated in a quarter of an hour if necessary.)

5. Alum powder, a tablespoonful in water.

6. Apomorphia tabloids, $\frac{1}{15}$ grain in each; two tabloids may be given by the mouth, or one as an injection under the skin.

7. The finger or a feather thrust down the throat may excite vomiting.

Directions.—It is best to give the first emetic which can be obtained, for the matter is urgent. If vomiting fails to occur—and this is very likely in narcotic poisoning, in which the nervous system is numbed—repeat the dose or try another emetic. Make the patient drink plenty of tepid water.

LIST OF POISONS

The particulars given in the following list of poisons and the directions for treatment are based on the rules laid down by Dr. William Murrell in "What to do in Cases of Poisoning."

ACIDS

1. **Acetic acid** . glacial acetic acid. Used for destroying warts.

Symptoms.—Burns in mouth, pain in stomach, smell in breath.

2. **Oxalic acid**: "salts of sorrel," "essential salt of lemons." Mistaken for other drugs. This is the only crystalline powder that is a corrosive poison.

Symptoms of corrosive poisoning (p. 317). There are also cramp in legs, constriction in throat with hacking cough, purging, pulse imperceptible, languor. Stains of mouth white or brown; of clothes brown or reddish. Sometimes instant death.

3. **Tartaric acid**. Mistaken for aperient medicine.

Symptoms of corrosive poisoning (p. 317). There are also convulsions.

Nos. 1, 2, and 3 are vegetable acids. The *treatment* for these is as follows: Give chalk, whiting, lime, whitewash off wall or ceiling, in water, and freely. Lime water or saccharated solution of lime in teaspoonful doses, frequently repeated. An ounce of castor oil afterwards. Milk, oil, and thick gruel freely.

Do *not* give an emetic. Do *not* give potash, soda, ammonia, or their carbonates.

4. **Hydrochloric acid**: muriatic acid; spirits of salt. Usually mistaken for beer or brandy.

Symptoms of corrosive poisoning (p. 317). The mouth is greyish white, the clothes are stained red.

5. **Nitric acid**: aqua fortis. Used for testing urine. Taken by accident.

Symptoms of corrosive poisoning (p. 317). The mouth is stained bright yellow, clothes yellow, orange red, or brown. Often there is suppression of urine.

6. **Sulphuric acid**: oil of vitriol. Taken in mistake for olive oil, or suicidally

Symptoms of corrosive poisoning (p. 317). The tongue is white or charred to brown or black, the spots on the clothes are dirty brown with red edges. Sometimes there are convulsions from extreme pain; death may be very sudden.

Nos. 4, 5, and 6 are mineral acids. Do *not* give an emetic. Give soap and water in large draughts; chalk, bicarbonate of potash or soda, sal volatile, washing soda, whiting, wall plaster, whitewash, lime-water, or magnesia freely diluted with water, and *at once*.

Later give milk, beaten-up eggs, olive oil $\frac{1}{4}$ pint in 1 pint of water, thick gruel, linseed tea, arrowroot or gum and water.

A dose of morphia will relieve pain and diminish shock, and the strength may be maintained by enemata of nourishing fluids.

For other acids see Carbolic Acid, Carbonic Acid, Prussic Acid, in the alphabetical list.

ALKALIS

1. **Caustic potash**: solution of potash; pearlash. Used for washing purposes or cleaning lamps. Taken by accident.

Symptoms of corrosive poisoning (p. 317). There is purging with great pain in the abdomen and much straining.

2. **Caustic soda**: soap lees.

Symptoms as with caustic potash.

3. **Ammonia**: solution of ammonia, liquid ammonia, spirits of hartshorn. Taken by mistake for sal volatile or in a liniment.

Symptoms of corrosive poisoning (p. 317). The lips and tongue are red, glazed, and burnt, and covered with shreds of mucous membrane. There is suffocating cough and difficulty of breathing ; the voice reduced to a whisper. Strong smell of ammonia in breath.

Treatment of all three caustic alkalies.—Do *not* give an emetic. Give vinegar freely diluted with water ; lemon or orange juice in water ; toilet vinegar or any other acid well diluted.

Follow these with milk, taken freely ; olive oil ¼ pint to 1 pint of water, white of egg and water, gruel, barley water. Give morphia for pain and shock, and stimulants.

POISONS ARRANGED ALPHABETICALLY

Aconite.—Obtained from monkshood, wolfsbane, or blue rocket, a common plant found in every cottage garden, all parts of which are poisonous. The root has been mistaken for horseradish, the leaves eaten for salad. Aconite liniment has been taken by mistake, an overdose of the tincture has been taken for a cold. Neuralgia mixtures often contain aconite.

Symptoms.—Warmth at the pit of the stomach, tingling of the mouth, lips, and tongue, which spreads all over the body ; numbness at the tips of the fingers and loss of sensibility. Nausea is often experienced and may be followed by vomiting. Paralysis soon sets in, first of the lower and then of the upper extremities. The pulse becomes weak and slow, the breathing shallow and infrequent. The prostration is extreme although the mental powers remain clear. Death often occurs quite suddenly after some slight effort, as an attempt to sit up in bed.

Treatment.—An emetic should be given at once. Stimulants should be administered freely, and if vomiting is severe, should be given by enema. The body should be kept warm with blankets, hot bottles, and friction of the limbs. Complete rest is essential, and the patient should not be allowed even to sit up in bed until all symptoms have disappeared.

Alcohol.—See p. 306.

Almonds.—Essential oil of, oil of bitter almonds, almond flavouring, essence of peach kernels. Found in every kitchen, used by cooks for flavouring food. For symptoms and treatment, *see* Prussic Acid.

Ammonia.—*See* Alkalis (p. 321).

Antimony.—Tartrated antimony, tartar emetic or butter of antimony. Taken by mistake for Epsom salts, or in an overdose of medicine containing it.

Symptoms come on rapidly: burning heat, and constriction of or choking in the throat, difficulty in swallowing, excessive vomiting and purging, pain in the stomach, cramps in the calves of legs, faintness, perhaps delirium or paralysis, ending with severe collapse.

Treatment.—If vomiting is present, encourage it by giving draughts of tepid water. Give large doses of strong tea or coffee, and repeat them if they are brought up by vomiting. Later give white of egg in water, barley water, or milk freely. Pain may be relieved with a dose of morphia, and collapse by stimulants and warmth to the extremities.

Antipyrin.—This and similar drugs, such as antifebrin, phenacetin, exalgin, resorcin, may be taken accidentally in excessive doses.

Symptoms.—Vomiting ; the skin sweats profusely, sometimes a rash breaks out. Collapse often follows—face blue, pulse weak and irregular, and respiration slow.

Treatment.—Stimulants, warmth to extremities, complete rest in the recumbent position, and, if necessary, artificial respiration.

Arsenic.—Arsenious acid, white arsenic. A common poison, not allowed to be sold in small quantities unless coloured with soot or indigo, except for medicine. Is contained in Fowler's solution (which is flavoured with lavender), and in rat-paste, in vermin-killers and fly-papers. It is used also as a cleansing liquid to take fur off boilers, for stuffing animals, by dentists to kill nerves, is given to horses to improve their coats, and is found in common varieties of green wallpaper. Arsenic is contained in Scheele's green or emerald green, which, under the name of extract of spinach, has been used for colouring confectionery.

Symptoms.—These follow a large dose in from fifteen minutes to an hour. They are burning in the stomach and throat, with difficulty of swallowing, incessant vomiting, the material brought up often being blackened from a mixture of soot, or blue from indigo. The bowels are freely purged, with much straining, and often with a passage of blood. There are severe cramps in the calves and stomach-ache, the pulse becomes weak, frequent and irregular, the skin cold and clammy, and the patient passes into a state of collapse. (*See* Chronic Poisoning.)

Treatment.—An emetic should be given at once, and should be followed by large draughts of hot, greasy water, as it is important that all the poison should be removed from the stomach. The antidote is hydrate of iron, which must be freshly prepared in the following manner: Mix 1½ ounces of tincture of perchloride of iron with a wineglassful of water, and add ½ ounce of washing soda (carbonate of soda), dissolved in about ½ tumblerful of water. The whole should be taken as a draught, and repeated as necessary. Dialysed iron, two tablespoonfuls in hot water frequently repeated, or magnesia in unlimited quantities, may be substituted, each dose being followed by a little common salt dissolved in water. Give also milk and eggs, olive oil (¼ pint to 1 pint of water), and barley water. The shock must be met with stimulants, hot bottles, and blankets, and rubbing with warm oil, and the pain in the stomach by hot poultices.

Atropine.—*See* Belladonna.

Belladonna.—Deadly nightshade grows wild in many parts of the country, but is scarce. The berries, when ripe, are of a shiny black colour, and are liable to be eaten by children. There is but little danger if only a few berries have been eaten, for recovery has taken place after as many as fifty have been taken. The root and leaves are very poisonous. The liniment has been swallowed by mistake, and it is said that a teaspoonful of it has caused death.

Symptoms.—These are very characteristic. They are heat and dryness of the throat, difficulty of swallowing, and intense thirst; the face grows flushed, the eyes bright, the pupils greatly enlarged and insensitive to light. The sight is affected, delirium sets in with great mental excitement, the bowels are purged and the urine may be suppressed, and there is fever with quickened pulse, but the respiration is slow and deep. A skin eruption sometimes occurs, which is rather similar in appearance to that of scarlet fever.

Treatment.—Give an emetic and follow it with stimulants, such as brandy, whisky, sal volatile, or strong coffee. If these cannot be swallowed, they must be given as an enema. Mustard poultices should be applied to the calves of the legs, hot bottles to the feet, and the patient, if inclined to sleep, should be roused by flicking with a wet towel, alternate hot and cold douches to the head, or an electric battery. Artificial respiration may be required. The antidote is pilocarpine, ½ grain tabloid, given under the skin or swallowed.

Blue Stone.—*See* Copper.

Burlett's Fluid.—*See* Zinc.

Camphor.—A popular remedy for colds ; in solid form used as an insect-destroyer. An overdose of spirits of camphor, Rubini's essence, or camphorated oil may be taken ; or camphor liniment may be drunk.

Symptoms.—Strong smell in breath, giddiness, faintness, noises in ears, convulsions, delirium, prostration, with clammy skin, quick, weak pulse, and difficult breathing ; pain, purging, and vomiting are absent. Recovery is sometimes preceded by a long sleep and a free sweat.

Treatment.—Give an emetic. Avoid all spirits, use smelling salts, warmth to extremities, rubbing with brandy, hot and cold douche to head and chest.

Cantharides.—The Spanish fly, blistering fluid, or hair wash may be taken by accident, given as a joke, or absorbed through the skin from the free application of ointment.

Symptoms.—Burning pain in throat and stomach, with difficulty of swallowing, vomiting of mucus and blood containing shiny particles, diarrhœa, swelling of salivary glands, with free secretion of saliva, constant desire to pass water, but only a few drops are passed, which contain albumen and are mixed with blood. Inflammation may be set up in the kidneys and peritoneum, with fever, quick pulse, headache, and convulsions.

Treatment.—If the patient is seen at once, give an emetic ; but if the throat is blistered, give white of egg, milk, barley water, gruel, or linseed tea. Do *not* give any oil or fats. Hot baths or linseed poultices should be employed if the pain in the stomach is severe. For this morphia may be required, especially if there is much diarrhœa and straining.

Carbolic Acid, Phenol.—This is a very popular disinfectant, and is a deadly poison and the cause of many accidents. A tablespoonful of it is almost invariably fatal. It may be taken intentionally, or be drunk by mistake. A lotion may be administered for medicine, or carbolic oil given instead of castor oil. The poison may also be absorbed when applied to a large wound.

Symptoms are those of corrosive poisoning (p. 317). The mouth and lips are white and burnt, the urine is scanty and perhaps suppressed; that which is passed is dark green or even black. The nervous system is severely affected, the patient becoming insensible and collapsed. Occasionally there may be a great improvement, with a return to consciousness, only to be followed in the course of a few hours by collapse and death.

Treatment.—This differs from that of other corrosive poisons, for if seen early an emetic should be given. Sulphate of magnesia or soda should be given freely, ½ ounce of either in 1 pint of warm water, and the vomiting should be encouraged by repeated doses until there is no smell of carbolic acid in the fluid rejected by the stomach. Saccharated solution of lime, a teaspoonful to 1 pint of warm water, is also useful for the same purpose. Having thoroughly emptied the stomach, give milk *ad lib.*, white of egg, with plenty of water, and olive oil ¼ pint to 1 pint of water. Later the sulphate of magnesia or soda may be repeated. Alcohol and other stimulants with warmth and friction to the extremities will be required to counteract shock. Artificial respiration and an enema of salt water, a teaspoonful to 1 pint, may have to be resorted to.

Carbonic Acid.—*See* Unconsciousness (p. 308).

Carbonic Oxide Gas.—*See* Unconsciousness (p. 308).

Caustic Potash or Caustic Soda.—*See* Alkalis (p. 322).

Charcoal Fumes.—*See* Unconsciousness (p. 308).

Chloral.—Chloral hydrate, syrup of chloral chloralamide. A commonly used sedative. An overdose may be taken as a sleeping draught. The drug has a tendency to accumulate in the system.

Symptoms.—Profound sleep, deepening into coma. The face becomes blue and swollen, the hands and feet very cold, the pulse fails, the breathing grows slow and stertorous, the temperature falls very low, and death often results from failure of the heart.

Treatment.—Give an emetic, keep the patient awake in every way possible, by constantly rousing him, flapping his face and chest with a wet towel, by mustard to the calves of the legs, or even the electric battery. It is most important to keep the patient warm. He should be covered with hot blankets, hot bottles placed to his feet, and his limbs well rubbed. Hot strong coffee should be given him to drink if he is conscious, or as an enema if unconscious. Stimulants are useful. Artificial respiration should be adopted if the breathing tends to fail.

and should be continued for some hours. Inhalations of oxygen gas are also useful.

Chlorodyne.—*See* Opium (p. 307).

Chloroform.—This drug may be inhaled (*see* Unconsciousness, p. 308), or drunk by mistake. In the latter case the *symptoms* are strong smell in breath, unsteady gait, occasionally vomiting, gradually developing insensibility, with dilated pupils, stertorous breathing, and imperceptible pulse.

Treatment.—Give an emetic, and carbonate of soda dissolved in plenty of water, keep the patient from going to sleep by every means possible. Strong coffee may be given as an enema. The patient should be carefully watched for some time, as there is a tendency for the symptoms to return.

Coal Gas.—*See* Unconsciousness (p. 308).

Cocaine.—Taken accidentally, or in an overdose when used medicinally.

Symptoms.—Giddiness and faintness, with quick pulse and respiration, tremblings, convulsions, and mental aberration from involvment of the nervous system.

Treatment.—Give an emetic, follow up with stimulants, brandy or sal volatile, and, if necessary, perform artificial respiration.

Copper.—Verdigris, blue vitriol, bluestone. Many cases of copper poisoning are caused by the use of copper utensils in cooking, or the poison may be taken in pickles, to which it is added to give them a good colour.

Symptoms.—A metallic taste in the mouth, severe griping pains in the abdomen, vomiting, accompanied with much straining, in later stages giddiness and headache, jaundice, partial suppression of urine, convulsions, delirium, and occasionally unconsciousness.

Treatment.—First of all give large quantities of milk and eggs, then follow with an emetic. When the stomach is empty give plenty of barley water, arrowroot, or gruel. Hot linseed poultices should be applied to the abdomen. Morphia is useful to check the pain and diarrhœa.

Corrosive Sublimate.—Perchloride of mercury, white precipitate, vermilion, cinnabar, and other mercury salts. Corrosive sublimate is often taken as a lotion by mistake; it is used for killing insects and preserving wood.

Symptoms.—A metallic taste in the mouth, and a sense of constriction in the throat, severe stomach-ache, vomiting, and purging of stringy mucus and blood. Lips and mouth white and shrivelled, pulse small, rapid, and irregular, urine often suppressed. Occasionally there are convulsions, ending in death.

Treatment.—First give large quantities of white of egg beaten up with milk or water. If these cannot be obtained, give flour and water, arrowroot, barley water, or gruel. After this give an emetic. Stimulants may be required for exhaustion, and laudanum to check the pain and purging.

Cyanide of Potassium.—Used in photography and to clean lace. (*See* Prussic Acid.)

Deadly Nightshade.—*See* Belladonna.

Digitalis (Foxglove).—Mistaken for other drugs.

Symptoms.—Purging, with severe pain in the stomach, vomiting of grass-green material, slow, irregular, and feeble pulse, dilated pupils, which do not react to light, skin covered with cold sweat, often suppression of urine. Unconsciousness and death may occur quite suddenly.

Treatment.—Give an emetic. When this has acted, give half a teaspoonful of tannic or gallic acid in hot water, or large draughts of hot, strong tea or coffee, which should be repeated. Keep the patient in the recumbent position for some time after all symptoms have subsided, give stimulants, hot gin or brandy or sal volatile and hot water.

Ether.—*See* Unconsciousness (p. 308).

Fungi.—*See* Mushrooms.

Gases.—*See* Unconsciousness (p. 308).

Hartshorn or Ammonia.—*See* Alkalis (p. 322).

Hydrochloric Acid.—*See* Acids (p. 321).

Hydrocyanic Acid.—*See* Prussic Acid.

Iodine.—Usually taken by mistake.

Symptoms.—Pain and heat in throat and stomach, vomiting of yellow or blue material, purging; stools may contain blood; intense thirst. Giddiness, faintness, and convulsions may occur.

Treatment.—Give an emetic, followed by large draughts of starch with cold water, or bicarbonate of soda (a dessertspoonful with water), with milk and eggs or flour and water. Morphia may be required to relieve the pain.

Lead.—Sugar of lead, white lead, Goulard's solutions.

Symptoms.—Dryness of throat, metallic taste, great thirst, severe pain about navel, relieved by pressure, cramps in legs, constipation.

Treatment.—Give an emetic, follow with Epsom salts or Glauber's salts, a tablespoonful of either in a tumblerful of hot water. Then give milk, white of egg and water, and barley water, and apply poultices to the abdomen. (*See* Chronic Poisoning.)

Matches.—*See* Phosphorus.

Morphia.—*See* Unconciousness (p. 307).

Mushrooms and Fungi.—Many of these are poisonous, and produce serious symptoms. They are more likely to produce inconvenience if stale, badly cooked, or warmed-up again.

Symptoms come on in half an hour to an hour after eating, with violent pain in the stomach, vomiting and diarrhœa. There is at first mental excitement, gradually followed by loss of consciousness; the heart fails, breathing becomes stertorous, and there is much prostration, death, when it occurs, being due to failure of the heart.

Treatment.—Give an emetic, and when this has acted, 1 ounce of castor oil. Stimulants should be given and warmth applied to the extremities and abdomen. The antidote is belladonna, 20 drops of the tincture in water, or a hypodermic injection of $\frac{1}{60}$ grain of atropine.

Nicotine.—*See* Tobacco Poisoning.

Nitric Acid.—*See* Acids.

Nux Vomica.—*See* Strychnia.

Oil of Vitrol.—*See* Acids (p. 321).

Opium.—*See* Unconsciousness (p. 307).

Oxalic Acid.—*See* Acids (p. 320).

Paraffin, Kerosine, Petroleum.—These may act as poisons, and have been taken by mistake for ginger-beer.

Symptoms.—There is intense burning in the mouth, gullet, and stomach, and vomiting of material containing the oil, followed rapidly by collapse.

Treatment.—Give an emetic, follow it with stimulants, employed freely, and keep the body well warmed.

Phosphorus.—Taken as phosphorus paste or rat poison, or by sucking matches, the latter being the cause of many accidents amongst children. Only the yellow phosphorus is poisonous; the red is harmless.

Symptoms occur in two stages: those that supervene a few hours after taking the poison, and those that set in three or four days afterwards. During the interval the patient feels simply upset and out of health.

The early symptoms are taste of garlic and smell of phosphorus in the breath, with a burning pain in the stomach, thirst, swelling of the abdomen, and vomiting. The vomited matter contains blood, is black or green in colour, has a smell of garlic, and shines in the dark.

If the patient survives this stage, there may follow, several days later, pain over the liver, which is enlarged, strongly marked jaundice, distension of the abdomen, and great prostration. Hæmorrhages occur from the nose, stomach, or bowels. Severe illness sets in with cold sweats, failing pulse, scanty albuminous urine, convulsions, and unconsciousness. If recovery occur, it is very protracted.

Treatment.—Give an emetic, then an antidote. For the emetic, sulphate of copper, 3 grains dissolved in 4 ounces of water every five minutes until vomiting is induced, then every fifteen minutes. For the antidote, French oil of turpentine, 30 drops in 1 ounce of water every quarter hour for four doses, then three times a day. American and German turpentines are useless.

Give Epsom salts ½ ounce dissolved in water, then milk and eggs. Oils and fats should never be given. Morphia may be used to soothe the pain.

Potash (caustic potash).—*See* Alkalis (p. 321).

Prussic Acid (Hydrocyanic Acid).—A most deadly poison, which kills with marvellous rapidity.

Symptoms come on in the act of swallowing or immediately afterwards. Giddiness, staggering, loss of power, rapid insensibility, with eyes fixed and glistening, and dilated pupils. The breathing is carried out in gasps at long intervals, the pulse fails, the skin grows cold and clammy, the limbs helpless, convulsions may occur, and death soon follows.

The breath has the characteristic odour of bitter almonds.

Treatment.—Give an emetic at once. Place the patient in the open air, and dash cold water over him, or pour it from a height on his head and spine.

Artificial respiration is often required, which may be carried on whilst the stimulating treatment is continued. If the patient can swallow, give brandy, gin, champagne, or any stimulant which is most accessible.

Ptomaines and Poisons of Animal Products.—*See* Vol. II., p. 217.

Treatment.—Give an emetic, and follow it up with 1 ounce of castor oil. Treat shock with warmth and stimulants. An injection of atropine under the skin is useful.

Rat Paste.—*See* Phosphorus.

Salt of Sorrel, Salt of Lemon.—*See* Oxalic Acid (p. 320).

Snake Bite.—*See* Vol. II., p. 201.

Soap Lees.—*See* Caustic Soda (p. 322).

Soda, Caustic Soda.—*See* p. 322.

Soothing Syrups.—*See* p. 307.

Strychnia.—Contained in nux vomica, Easton's Syrup, and many vermin killers. Too large a dose of medicine may be taken, or the poison may be used with suicidal or homicidal intention. It is a common form of poisoning.

Symptoms.—There is a feeling of suffocation and difficulty of breathing, with blueness of the face. Attacks of convulsions come on at short intervals, the body becomes stiff and arched and the limbs rigid; the muscles of the face are affected, giving an expression which is called "risus sardonicus." The eyes become prominent, the pupils dilated, and the breathing ceases. In the later stages, the muscles of the jaw are also affected. Throughout these violent spasms, which cause intense pain, the patient remains perfectly conscious, and his sight and hearing are unaffected; the slightest movement, noise, or light sets up an attack of these painful cramps. The only condition for which strychnia poisoning can be mistaken is that of tetanus (lockjaw). The latter disease, however, almost always follows some wound, and the first symptom which shows itself is a spasm of the muscles of the jaw.

Treatment.—Give an emetic in the early stages so long as the patient can swallow. Give also half a teaspoonful of tannin powder in a wineglassful of water, or half a teaspoonful of tincture of iodine in half a tumblerful of water, and then repeat the emetic. Bromide of potash in large doses (2 or 3 drachms) in a tumblerful of water is a useful sedative, and relief will be obtained by inhaling chloroform. Artificial respiration is often necessary. The patient should be kept very quiet in a darkened room.

Sugar of Lead.—*See* Lead.

Sulphonal, Trional, Veronal.—These drugs in large doses cause vomiting and pain in the stomach, with disturbance of the nervous system, such as confusion of thought, loss of power in the limbs, severe collapse and unconsciousness. Suppression of urine sometimes occurs.

Treatment.—Give an emetic, and when this has acted follow it up with stimulants ; apply warmth to the limbs ; keep the patient strictly to the recumbent position. Employ artificial respiration if the breathing fail.

Sulphuric Acid.—*See* p. 321.

Syrup of Poppies.—*See* p. 307.

Tartaric Acid.—*See* p. 320.

Tobacco, Nicotine.—May be taken by mistake for coffee, or accidentally in chewing. Children may swallow it by blowing bubbles from an old pipe.

The *symptoms* are nausea, vomiting, and faintness, followed by great prostration with feeble pulse, clammy skin, and confusion of thought.

Treatment.—Give an emetic, and follow this with strong, hot tea, stimulants, warmth to the body, friction of the limbs. Keep the patient absolutely recumbent until the symptoms have passed off.

Trional.—*See* Sulphonal.

Turpentine, Oil or Spirits of Turpentine, Turps.—May be taken by mistake for other medicines, or the liniment may be drunk.

The *symptoms* are a smell of turpentine in the breath, gradually developing unconsciousness with contracted pupils, stertorous breathing, and violent convulsions. There is great irritability of the bladder, and the urine smells of violets.

Treatment.—Give an emetic, then 1 ounce of Epsom salts, with half a tumblerful of water. Also milk, white of egg and water, and barley water.

Vermin Killers.—Many of these contain strong poisons, such as strychnia, arsenic, or phosphorus. Battle's, Butler's, and Gibson's contain strychnia ; Simpson's, arsenic ; Roth and Ringeisen's, phosphorus and arsenic.

Veronal.—*See* Sulphonal.

White Precipitate.—*See* Corrosive Sublimate.

Zinc, White Vitriol, Burnett's Disinfecting Fluid.—*Symptoms.* The lips and throat are burnt, causing difficulty of swallowing, there is pain in the stomach, with vomiting of blood-stained fluid. Collapse sets in with quick breathing and pulse, and sometimes convulsions, paralysis, and total unconsciousness.

Treatment.—Do *not* give an emetic. Give freely white of egg and milk, also some alkali, carbonate of potash, or soda (common washing soda) dissolved in water ; also strong tea or tannic acid. Apply linseed poultices to the abdomen for the pain, and give 30 drops of laudanum.

LAWS CONCERNING THE SALE OF POISONS

Certain poisons specified in schedules are only allowed to be sold by qualified persons who are registered chemists and druggists, or who are otherwise qualified. The bottle or box containing the drug must be marked "Poison," and labelled with the name of the article and the name and address of the seller. Special regulations apply to the sale of arsenic, which must be mixed with soot or indigo. The more virulent poisons, too, including arsenic, prussic acid, strychnia, aconite, corrosive sublimate, are placed in a special list, and must not be sold to any person unknown to the seller unless by the introduction of a third person who is known to both. The purchaser's name and address, the date, the quantity of poison sold, and the purpose for which it is bought must be entered in a book, and the introducer and purchaser must sign their names to the entry. These regulations do not, of course, apply to doctors' prescriptions, but they do apply to patent medicines and to "vermin killers" if they contain any of the poisons included in the list.

Chronic Poisoning

In the preceding pages we have considered cases of poisoning produced by taking a large dose, which is followed at once by violent and acute symptoms. But many cases of poisoning may be caused by the long-continued entrance into the body of minute doses of poisonous substances. The symptoms are then of a quite different character, and come on so gradually and imperceptibly that it is often very difficult to explain their origin and to distinguish them from attacks of illness produced by disease. If neglected, however, very serious ill-health may supervene, and even death.

The drugs which chiefly concern us in this respect are lead, copper, mercury, phosphorus, and arsenic.

CHRONIC LEAD POISONING

This is a somewhat common affection, and is caused by the introduction of minute quantities of lead into the body, continued for a long time. It is most commonly met with in those whose occupation brings them in contact with the metal, such as painters, plumbers, and pottery glaze makers. A more important cause, because it is so likely to be overlooked, is the contamination of drinking water by leaden pipes and cisterns. This is especially likely to affect pure water or soft water which is lacking in lime salts, as rain-water and that derived from rivers and lakes. This water, with the oxygen obtained from the air, dissolves distinct traces of lead, which it would not do if lime salts were present. Lead has been at times imbibed in other drinks into which it has been introduced during the process of their manufacture—in rum, in the West Indies; in cider (Devonshire colic), and in wine (hence the name of *colica pictonum*, from the common occurrence of lead poisoning in the wine drinkers of Poitou).

Symptoms.

The symptoms of chronic lead poisoning include disturbances of the digestive organs, nervous system, and gout. Anæmia develops with an earthy coloured complexion, dryness of the mouth, furred tongue, offensive breath, and dyspepsia. A peculiar symptom which is very distinctive of this condition is the presence of a grey or bluish line along the edge of the gum, where it adjoins the teeth.

Lead colic is another common symptom, and occurs as paroxsyms of excruciating pain in the stomach, accompanied by both nausea and vomiting, and also by most obstinate constipation. It is relieved by pressure.

Lead palsy may follow attacks of lead colic. In it the muscles of the arm are chiefly affected, and the most common result is "wrist drop," in which when the arm is raised the hand drops by its own weight. Other muscles also may be affected. The paralysed muscles tend to waste rapidly.

Treatment.

The treatment of these affections must be both preventive and curative. For prevention it is necessary for those who in their work come in contact with lead to adopt the utmost cleanliness. They should never eat in the workroom, or with unwashed hands, or in working clothes; they should avoid inhaling dust containing lead by wearing respirators; they should take occasional doses of Epsom salts, and drink lemonade containing sulphuric acid.

Workmen who show signs of poisoning should discontinue work.

When lead contaminates the drinking water, the lead pipes and vessels should be changed for others, or the water may be made hard to neutralise its dissolving properties.

Lead colic is to be treated with purging by Epsom salts, and if the pain is very severe with a dose of morphia. Lead palsy requires massage and electricity. The poison may be removed from the system by Epsom salts and a course of iodide of potash.

CHRONIC COPPER POISONING

This affection is far less important and frequent than lead poisoning. It may occur in those who work in copper from neglect of cleanliness in eating their food, or it may be the result of eating food which has been cooked in copper vessels. Some foods are tainted with the metal—green pickles, vegetables, or sweets may be coloured with it, lemonade or oily foods kept in copper vessels may dissolve some of the metal, and fruits raised on manure containing copper may take up some of it.

The symptoms are chiefly connected with the digestive organs, such as nausea, sickness, and diarrhœa. The hair and sweat in extreme cases are said to turn green, and there is a dark line along the edges of the gums.

The only treatment necessary is to avoid the source of the poison.

CHRONIC MERCURY POISONING

This condition may be set up by long-continued medicinal doses of salts of mercury, or by the absorption of mercury, either through the digestive organs with food eaten with unwashed hands, or through the respiratory organs by inhaling vapours. The latter causes are chiefly operative in those whose work brings them much in contact with mercury and its compounds, such as looking-glass and barometer makers.

Symptoms.

The symptoms include inflammation of the mouth and gums, offensive breath, excessive flow of saliva, nausea, and pain in the stomach. In children these may go on to gangrene of the cheeks and endanger life. In bad cases the bones become diseased, the blood impoverished, and the kidneys affected, albumen appearing in the urine. A curious train of nervous symptoms sometimes arises : the limbs, especially the arms, are affected with tremors, which are worse when the muscles are being exerted, and cease during sleep. With the tremors are occasionally associated delirium and mental weakness.

Treatment.

The essential precaution is to avoid the risk of the poison by discontinuing the medicine or the dangerous occupation. Tonics are required to improve the health, antiseptic and astringent gargles and mouth washes to restore the mouth to a healthy state, and iodide of potash in 3- or 5-grain doses three times a day to eliminate the poison.

CHRONIC PHOSPHORUS POISONING

This was a common disease in the days when yellow phosphorus was used in manufacturing processes, especially among the makers of matches. The fumes of the poison found admittance through decayed teeth, and set up a destructive disease of the jaw and a fatty degeneration of the organs, especially of the liver and kidneys. These conditions are most difficult to cure. The treatment is preventive and is entirely effectual, for it is found that by using another form of the metal—namely, red phosphorus—all danger to the health of the workpeople is obviated.

CHRONIC ARSENIC POISONING

This complaint may follow the long-continued use of arsenic in medicinal doses, or the poison may be introduced accidentally in those who live in rooms the walls of which are covered with common green papers. The colour of these papers used to be produced by using a compound of arsenic and copper, called Scheele's green; the minute particles of pigment became easily detached, and, diffused through the air of the room, they were inhaled. Arsenic is used in the preparation of artificial flowers and of some fly-papers, and may poison those who are engaged in their manufacture. This drug has also been used with criminal intent, as the symptoms are easily mistaken for disease of the digestive organs, but the poison can readily be detected by chemical analysis.

Symptoms and Treatment.

The symptoms come on gradually. The appetite fails, the throat gets dry and sore, the gums tender, and the tongue white and shiny. The eyes are soon affected; they grow red, itching, and watery, and are very sensitive to light. Somewhat later digestive disturbance follows—nausea, vomiting, and looseness of the bowels, the patient's strength fails, a form of paralysis occurs, which spreads upwards from the limbs, and there is great nervous exhaustion. Eruptions are common with itching in various parts, and a thickening of the skin of the palms and soles. The occurrence of these symptoms is interesting, considering the wonderful immunity to poisoning which habit develops in some persons (*see* Vol. II., p. 247).

The treatment required is first to remove the source of the poison, and then to improve the general health and digestive organs with tonics and change of air.

POISONOUS PLANTS

Many plants common in various parts of the country contain poison in either their bark, roots, leaves, or fruit. These may be eaten by children and cause a good deal of anxiety. The bark and seeds of the common laburnum, the berries and leaves of the yew tree, the berries of bryony and the fruit of "lords and ladies" or cuckoo-pint (*Arum maculatum*), are all poisonous. Many species of the hemlock tribe are also noxious, but not dangerous, such as the wild parsley, fool's parsley, water hemlock, or cowbane (*Cicuta virosa*); their leaves may be eaten by children in mistake for parsley, and the last-named contains an active principle which in large quantities causes violent spasms, insensibility, vomiting, and diarrhœa. The common or spotted hemlock (*Conium maculatum*) is highly poisonous. It grows in hedges, or on heaps of rubbish, and has a peculiar mousy smell, especially if rubbed or bruised. Its stem is smooth and spotted with purple on the larger stems, whilst the harmless varieties are rough and without spots. The active principle, conine, was employed by the ancient Greeks to poison criminals, and it was from a dose of it that Socrates died. The symptoms are weakness of the legs, staggering as if from drink, paralysis, dilated and fixed pupils, and death from cessation of breathing. An emetic should be given at once to empty the stomach, followed by strong tea in large quantity, stimulants, warmth, and artificial respiration.

Hemlock.

There are several plants known as nightshade. The common nightshade of the hedgerow is not the deadly nightshade, but the woody nightshade, or bittersweet, which has purple flowers and red berries. The latter are poisonous, especially to children, but are unpleasant to taste and are seldom eaten in sufficient quantity to prove fatal. Another variety is the black or garden nightshade, with white flowers and black berries, which, although much dreaded, may be eaten in moderate quantity without danger. The leaves lose their narcotic effects when cooked, and are sometimes used as spinach. The deadly nightshade (*Atropa belladonna*) is a rare plant, has dull purple-coloured flowers, and black shiny berries the size of a cherry, marked with a deep central furrow. They are pleasant to the taste and attractive to children. The symptoms and treatment of deadly nightshade poisoning are those of belladonna (p. 324).

Nightshade.

Monkshood (*Aconitum napellus*) has a poisonous root, and has been eaten by mistake for horseradish, an accident which may easily arise as both plants are commonly cultivated in cottage gardens. They may be distinguished from one another by their shape, the monkshood being short, tapering to a point, with many rootlets, the horseradish long, blunt, and with few rootlets. When scraped the monkshood turns pink, the horseradish remains white. They both taste pungent and hot, but the monkshood produces numbness of the mouth. For symptoms and treatment, see Aconite (p. 322).

As many accidents arise from eating poisonous fungi by mistake for edible mushrooms, the following points of difference should be known.

Poisonous Fungi.

The edible variety has an agreeable taste and smell, a dry upper surface of a whitish colour, which readily peels off, and a pinkish or brown or black under-surface. It is found chiefly in dry open meadows. The poisonous kinds smell unpleasant and taste bitter, the upper surface is moist and will not peel off, the under surface is white or coloured, and the common habitat is in moist ground under trees, or growing on their trunks.

For the treatment of poisoning by fungi, *see* p. 329.

CHAPTER LXXII

TRANSPORT OF THE INJURED

Single-handed Transport—Transport by Two Persons—The Frog's March—Improvised Seats—Improvised and other Stretchers—Position of Patient on Stretcher—General Rules for Carrying Stretchers—Litters.

A DESCRIPTION of the various accidents and emergencies which are likely to be met with having now been given, and the measures of first aid appropriate to each having been indicated, our attention must next be directed to the means at our disposal by which the patient can be safely removed to his home or to a hospital. Just as we have had to improvise splints, bandages, and other appliances for the treatment, so now it may be necessary to improvise means of transport. In this chapter, therefore, we shall give details of the various means that may be employed to carry injured persons, and the actual method to be adopted must be left to individual ingenuity and the circumstances peculiar to each case.

The method to be chosen depends greatly upon the patient's condition, whether he is capable of helping himself and whether he is conscious or unconscious. It also varies according to the amount of assistance available, being different when there is but one person to render aid, and when there are two, three, or four persons.

SINGLE-HANDED TRANSPORT

If the patient is conscious and is able to assist himself—for example, if he has sprained his ankle, has broken his arm, or is faint from loss of blood or from pain—we may render it possible for him to reach his home without carrying him.

He must place his uninjured arm round the neck of his assistant, and let his hand hang over the shoulder. This hand should then be grasped by the assistant with one hand, whilst the other is passed round the patient's waist. In this way a fair amount of support may be given him. His injured foot should be on the side next the assistant, and may be kept off the ground if he bears his weight on the latter's shoulder as in using a crutch. If the other arm is free from injury, he may also help himself with a stick. If these measures are insufficient, the wounded person may be carried on the assistant's back.

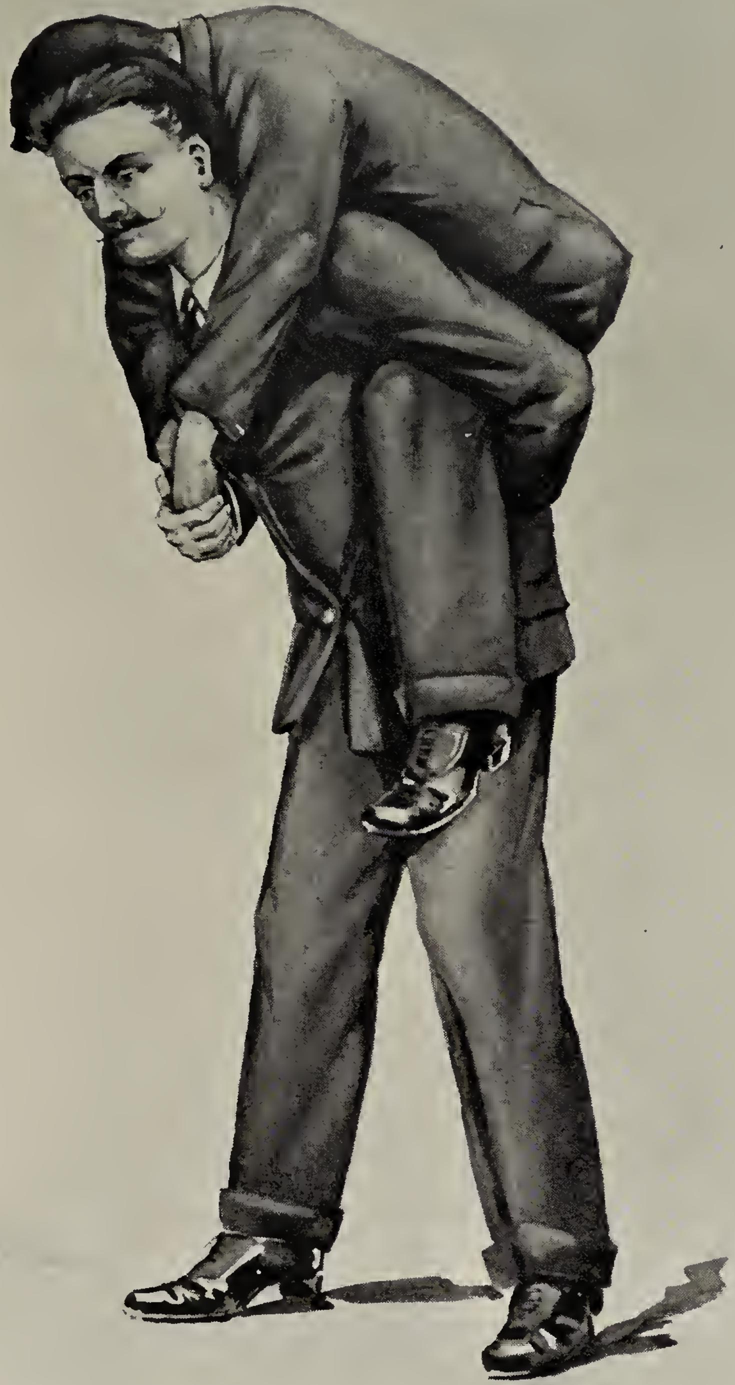
To move, single-handed, a patient who is unconscious or cannot use his lower limbs is a difficult matter. The simplest way is to pick him up in the arms as one would a baby and carry him. This is easy enough if the patient be a child or light person, but is almost impossible with an ordinary adult, unless the bearer has the strength of a giant. Unconscious adults may be moved in two ways, either "pick-a-back" or by the "fireman's lift," but in both of these methods it is exceedingly difficult to raise a perfectly helpless person into the proper position, and it is only those who have attempted it who can realise how great is the dead weight that has to be negotiated.

Carrying a Patient "Pick-a-back."

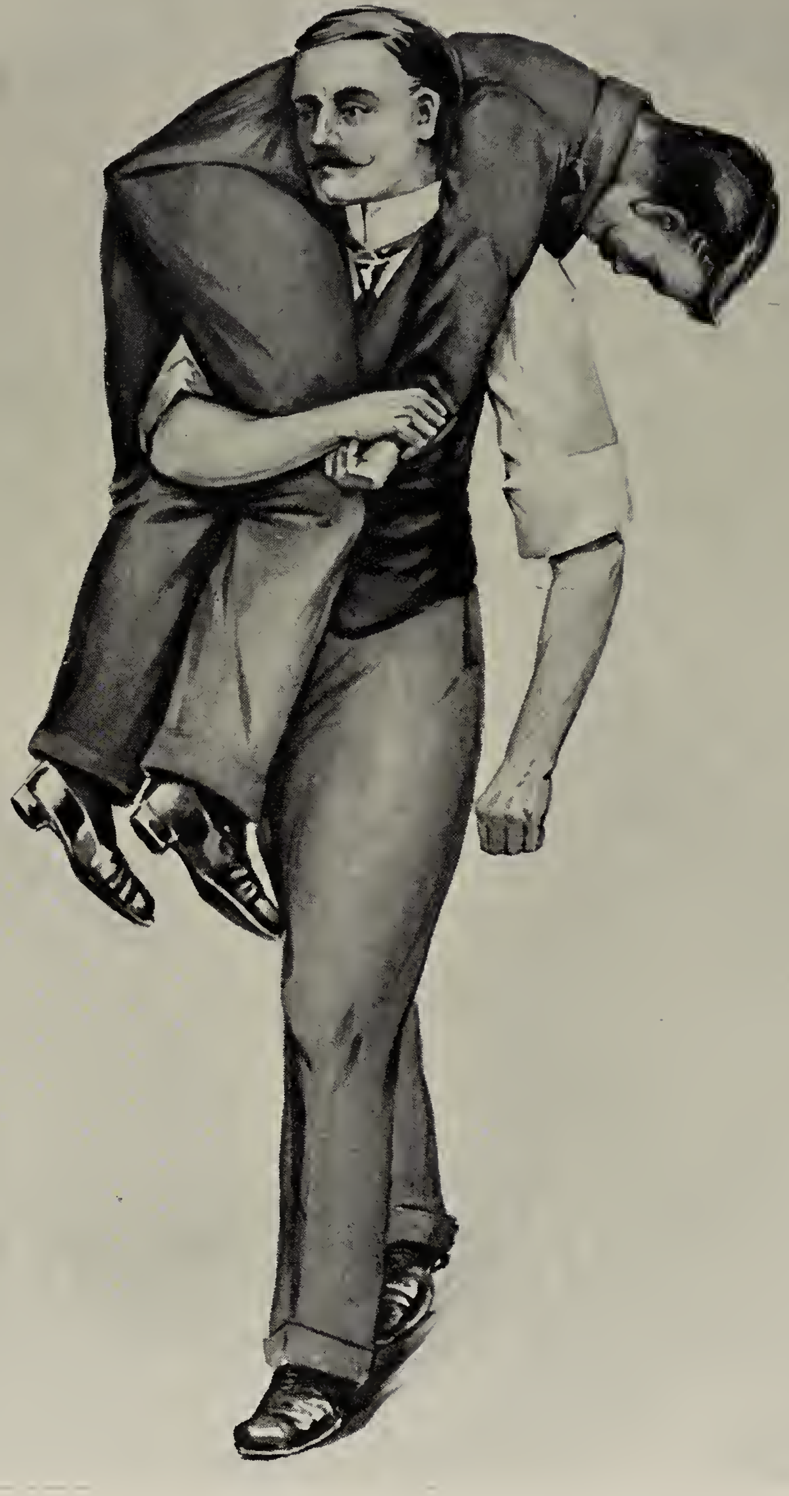
To raise the patient on to your back you must place him sitting up against a wall or in a corner with his legs spread apart. You must then kneel down between his legs with your back turned towards him. Then take hold of his arms and draw them forward over your shoulders, seizing both the hands with one of your own, and using the free arm to raise him well up on to your back.

The "Fireman's Lift."

The "fireman's lift" is a method in which the bearer only uses one arm to carry the patient, the other being left free, to hold on to a ladder or open a door. It has received its name from its common employment by firemen. The various steps to lift by this method are as follows: First lay the patient flat on his back, with his arms by his side and his legs stretched straight out. Then turn him gently on to his face with one of his arms folded under his forehead to project it from the ground. Now crouch down at his head and pass your hands and arms beneath his armpits and clasp your hands behind his back. Raise him gradually, first into a kneeling position and finally on to his feet, allowing his weight to rest against your body during each step of the process, until you can stand upright. Now stoop down and allow his body to fall over your right shoulder, carry his right arm round your neck, and seize the wrist of it with your left hand. Pass your right arm between his thighs, seizing the right one with a firm grip. His right wrist must now be transferred to your



CARRYING A PATIENT. "PICK-A-BACK."



THE "FIREMAN'S LIFT."

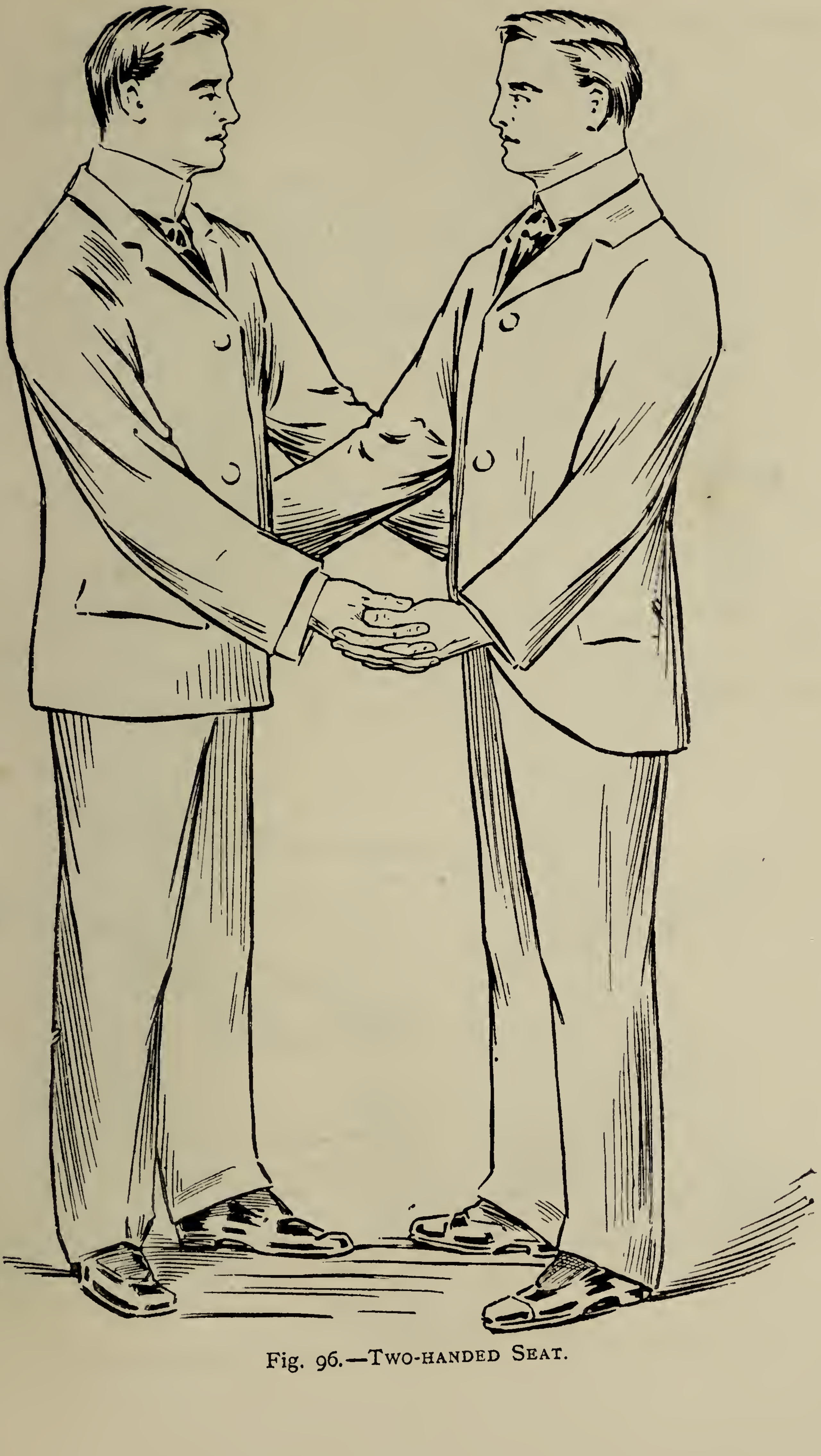


Fig. 96.—Two-handed Seat.

right hand, and you must slowly rise to an erect position, placing him in a safe and comfortable position over your right shoulder. The lift is now complete, and the bearer has his left hand free whilst he removes the patient to a place of safety.

Equal care is required in lowering the patient. Change the patient's right wrist from your right to your left hand, and take your arm from between his thighs and place it round them. Now kneel down on your left knee, passing the patient's legs towards that side and allow them to rest on the ground, and lean his body against your right leg for support. Now disengage his arm from around your neck, and gently lower him into a recumbent position on the ground.

TRANSPORT BY TWO PERSONS

When there is another person to assist, the various forms of " hand seat " can be adopted to carry a patient.

Two-handed Seat.

If the patient is unconscious or is incapable of using his arms to assist himself, we must use a two-handed seat (Fig. 96). The two bearers face one another. One locks the fingers of his right hand with those of the left hand of the other bearer, palms uppermost, and both place the disengaged hand upon each

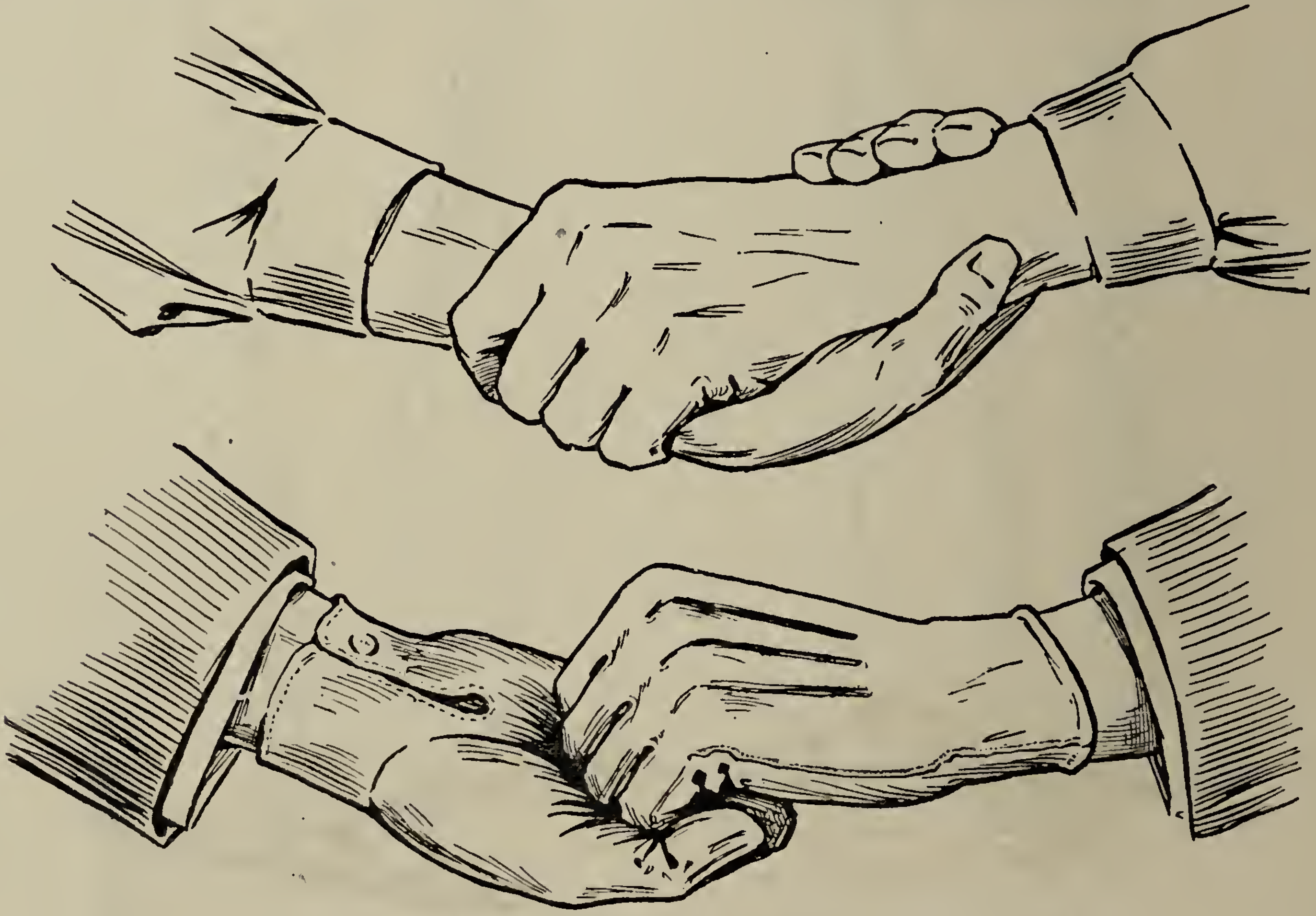


Fig. 97.—Alternative Forms of the Two-handed Seat.

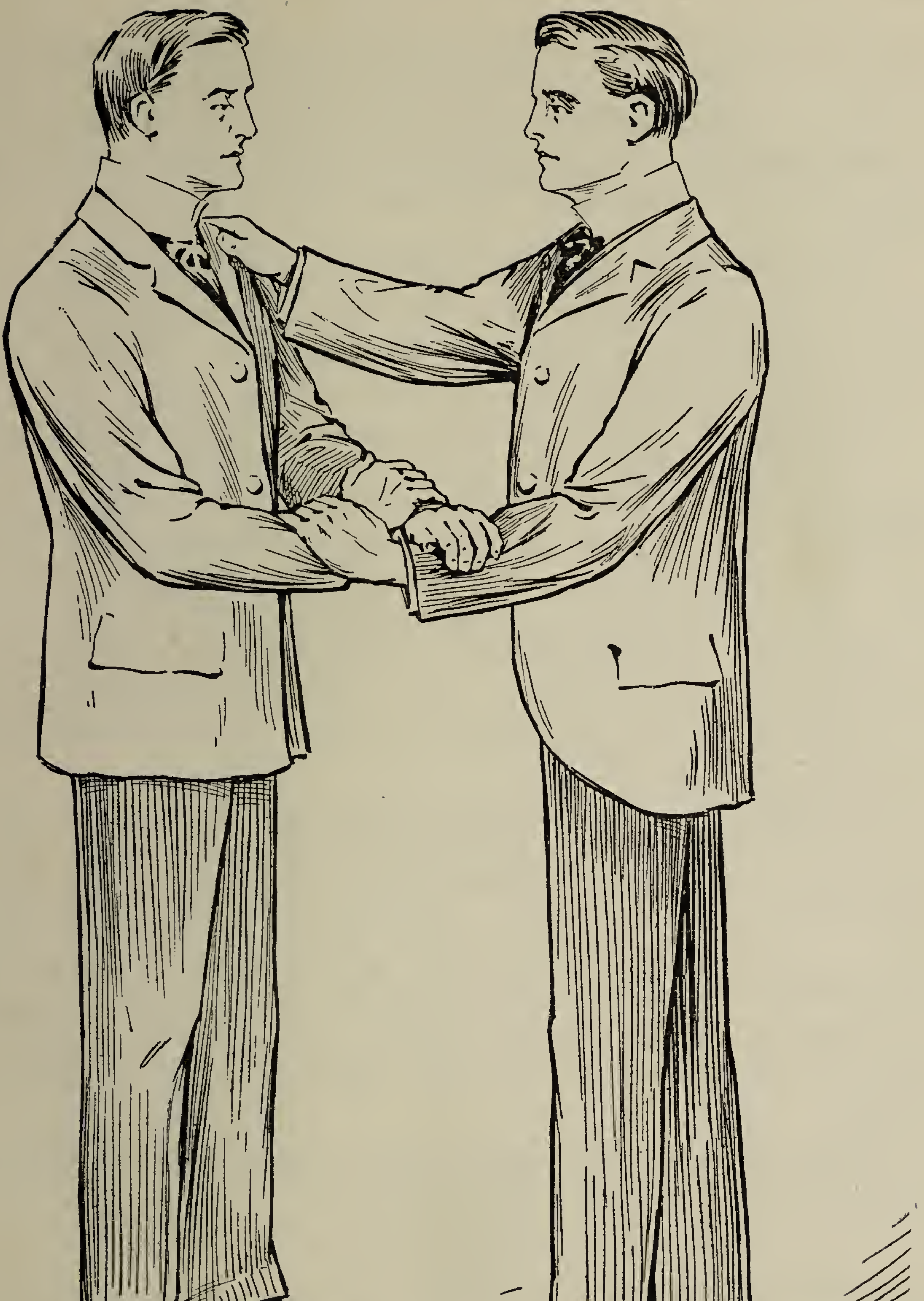


Fig. 98.—Three-handed Seat.

other's hips for a short patient, or upon each other's shoulders for a tall one. To raise a patient from the ground on this seat, it is necessary for the two bearers to kneel down, one on each side of the patient, on the knee nearest to his feet, pass their clasped hands under his thighs, cross their other arms behind his back, and rise gradually to an erect position.

Alternative forms of the two-handed seat are shown in Fig. 97. If the lower of the two is adopted the hands should, if possible, be protected with gloves, as shown in the illustration. If gloves are not accessible, a handkerchief or neckerchief may be used.

If the patient is conscious and capable of raising himself into the seat, but is deprived of the use of his arms, we should adopt the three-handed seat (Fig. 98). The bearers stand facing one another. One of them grasps his own left forearm with his right hand, and the other bearer's right forearm with his left hand. The second bearer grasps the right forearm of the first with his right hand, and places his left hand on the other's right shoulder. With this seat it is impossible to raise a patient safely from the ground; he should be in a standing position, and the bearers stoop instead of kneeling to take him up.

Three-handed Seat.

If the patient is conscious, can raise himself on to the seat, and can be trusted to keep himself in position by holding on with his arms, we should use the four-handed seat (Fig. 99). The bearers stand facing one another. Each grasps his own left wrist with his right hand and then grasps the other bearer's right wrist with his left hand. The backs of the hands should face upwards. The bearers stoop to raise the patient, who should be standing, and should be directed to pass an arm round the neck of each of the bearers.

Four-handed Seat.

This seat is much less fatiguing to the bearers than the others, and the patient can be carried for long distances.

THE FROG'S MARCH

Sometimes a patient is carried by ignorant persons, or for fun, by his arms and legs, with his face turned towards the ground. This is called the "frog's march," and, as it may seem superfluous to say, is very dangerous. It has been known to produce severe injury, and even death.

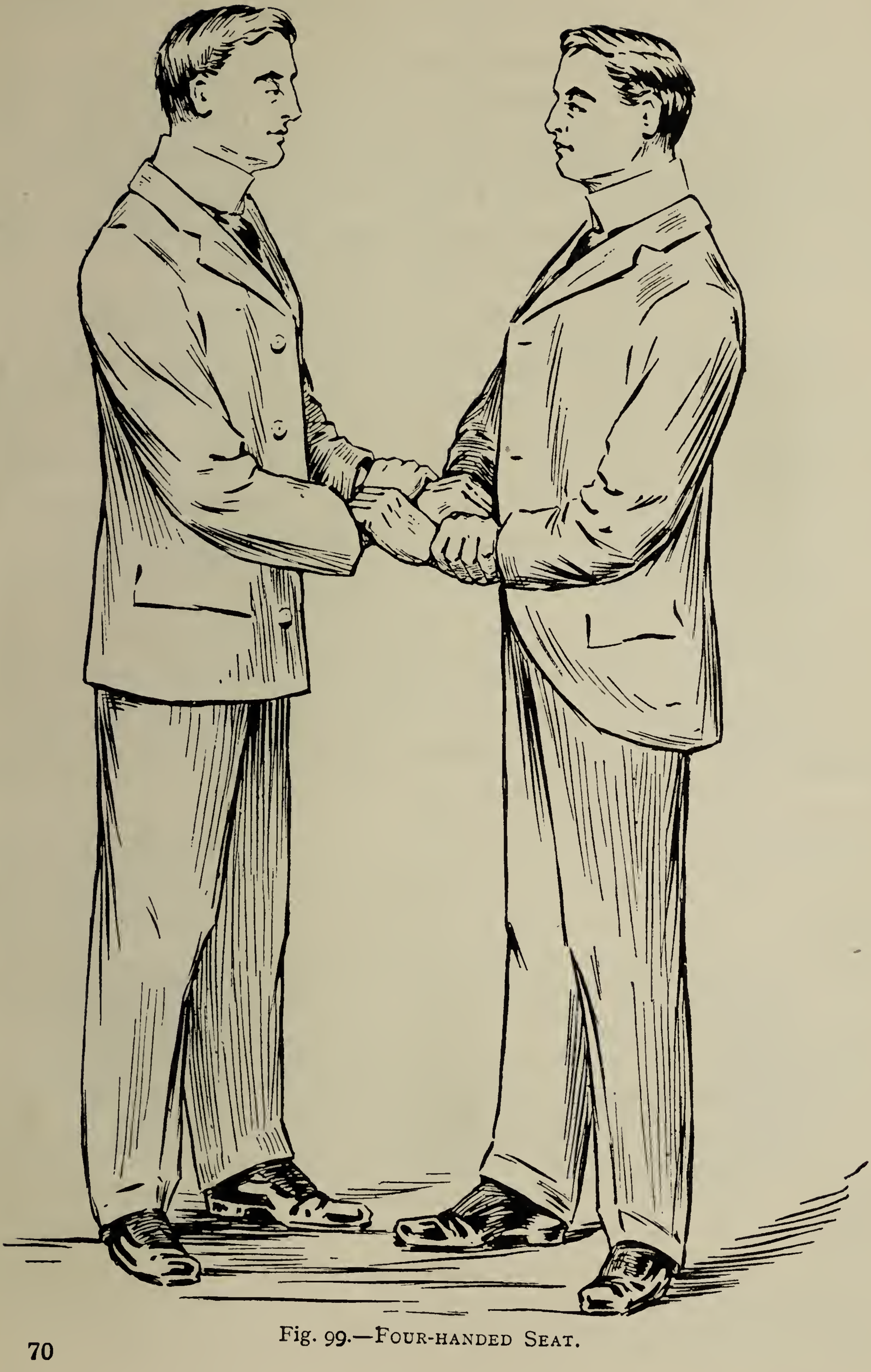


Fig. 99.—Four-handed Seat.

IMPROVISED SEATS

It is often possible to improvise seats upon which a patient may be carried in a sitting position with far less strain to his bearers. These may be made out of broad strips of any strong material, a strap, or a board of suitable size. A coat with its sleeves turned inside out will make a good seat if poles be passed through the sleeves and the patient be allowed to rest against the leading bearer's back.

IMPROVISED STRETCHERS

On many occasions the foregoing methods of carrying patients are unsuitable, for he may be unconscious or so severely injured as to make it dangerous to carry him in any but the recumbent position. It is then necessary to employ some form of stretcher. If a proper stretcher is not forthcoming there are many means of improvising one on the spot. We will give some suggestive examples.

To begin with, a shutter or hurdle can be used for the purpose, or a coster's barrow.

Coat Stretcher.

A *coat stretcher* is formed of two coats—by preference greatcoats, as being stronger and firmer—and two long poles. The sleeves are turned inside out, and the poles are run through the sleeves, the lower parts of the coats coming in contact at the centre and the buttons being fastened up underneath the stretcher, so that the patient will not be lying on them.

Sack and Other Stretchers.

A *sack stretcher* can be formed of two sacks, holes being cut through the corners at the bottom and the poles passed through them.

Ropes or straps may be tied to two poles to form a sort of *latticework*, on which the patient may lie.

A *form stretcher* consists of a school form covered with a rug; or two strong *forms* may be fixed together and carried by their ends, or poles may be passed under them at right angles.

Rug or Blanket Stretcher.

A *rug*, *blanket*, or any large piece of material strong enough to bear the patient, with two strong poles may be readily made into an efficient stretcher. The poles are laid on each side of the rug, and rolled up towards the centre until there is just sufficient width for the patient to lie between them. The bearers then walk at the sides, firmly grasping the material as well as the pole with both hands, one placed at the centre, the other at the end, so as to prevent the poles from separating from the rug.

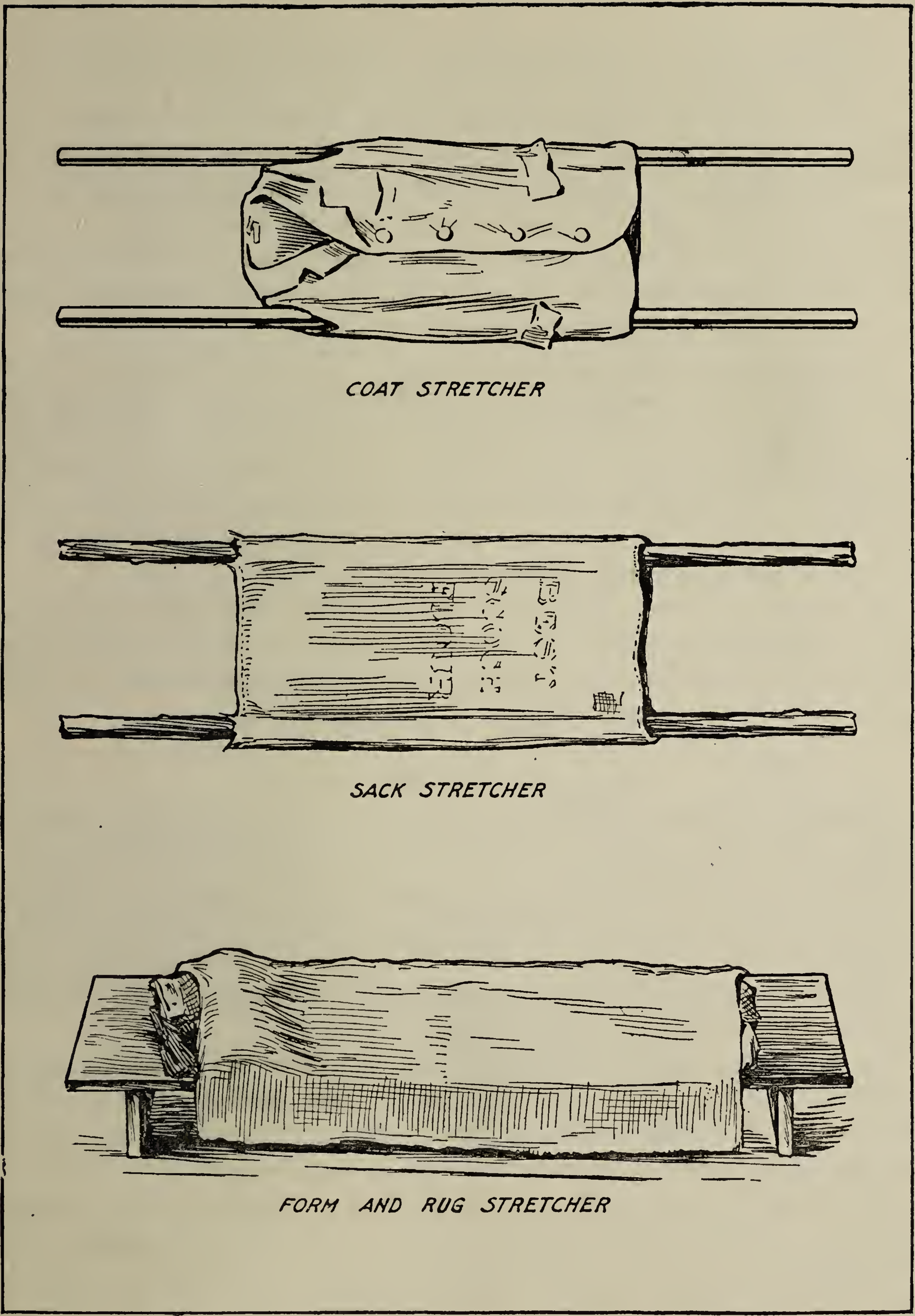


Fig. 100.—Some Improvised Stretchers.

Rifle Stretcher.

The *rifle stretcher* is formed of two rifles with fixed bayonets and a rug, and makes an efficient means of moving a patient if four bearers are forthcoming. The following method of preparing it has been suggested by Sergeant F. J. Spary, of the Medical Staff Corps: A blanket or rug should be spread out on the ground, and the two rifles laid parallel with its centre and about 10 inches from it. The two muzzles must point in the same direction and the trigger guards must be turned outwards, a careful inspection being first made to see that the weapons are unloaded.

The blanket is then folded up thus: The butts are first covered with a fold some 6 inches wide, the right side is folded over the rifle on that side so as to reach the other rifle, and the left side is folded over in a similar way. The stretcher is thus made of three folds of blanket. The patient's head should lie towards the butts. The stretcher is carried by firmly grasping the rifles with both hands so as to prevent any slipping of the blanket.

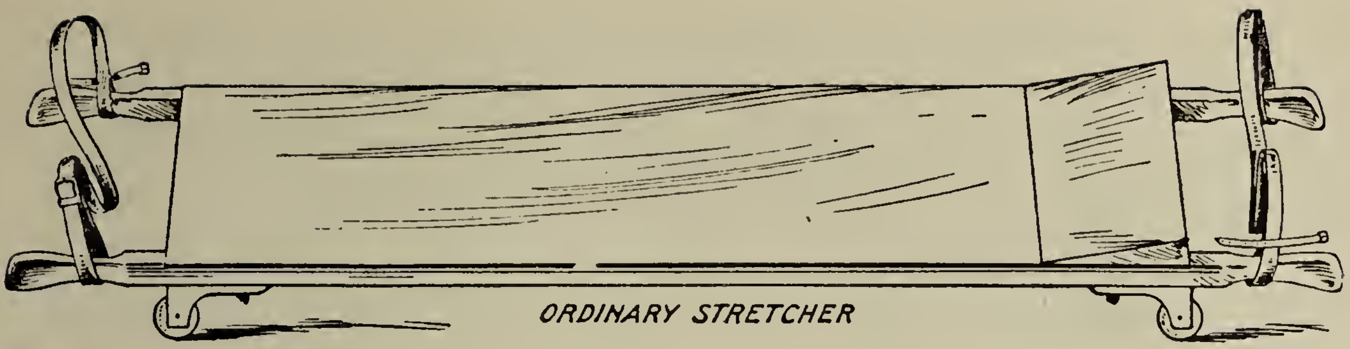
It is well to cover all hard stretchers with some soft material, as hay or clothing, and also to try the strength of every extemporised stretcher before putting the patient on it, or his injuries may be much aggravated by the breaking down of the apparatus.

STRETCHERS

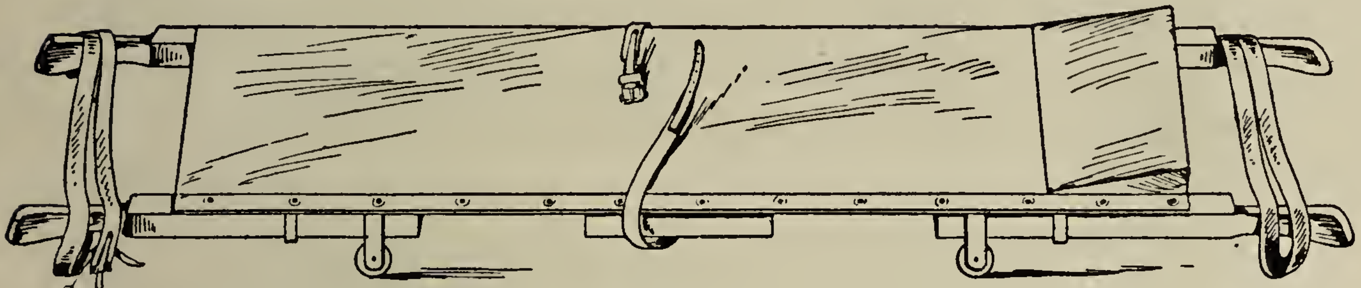
Stretchers proper are made of many patterns. In the ordinary variety (Fig. 101) the poles are 7 feet 9 inches long and the canvas is 6 feet long and 22 inches wide. It is raised on four wheels or rollers, and the poles are kept apart when the stretcher is open by jointed bars called traverses, which are folded up when it is closed. It is provided with a pillow, which may be fixed to either end in some patterns, through eyelet holes provided for the purpose.

To the more modern forms of this stretcher are fixed telescopic handles (Fig. 101), which can be pushed inwards beneath the stretcher, and enable the bearer to reduce the length when space is limited, as in carrying a patient downstairs or into a small room.

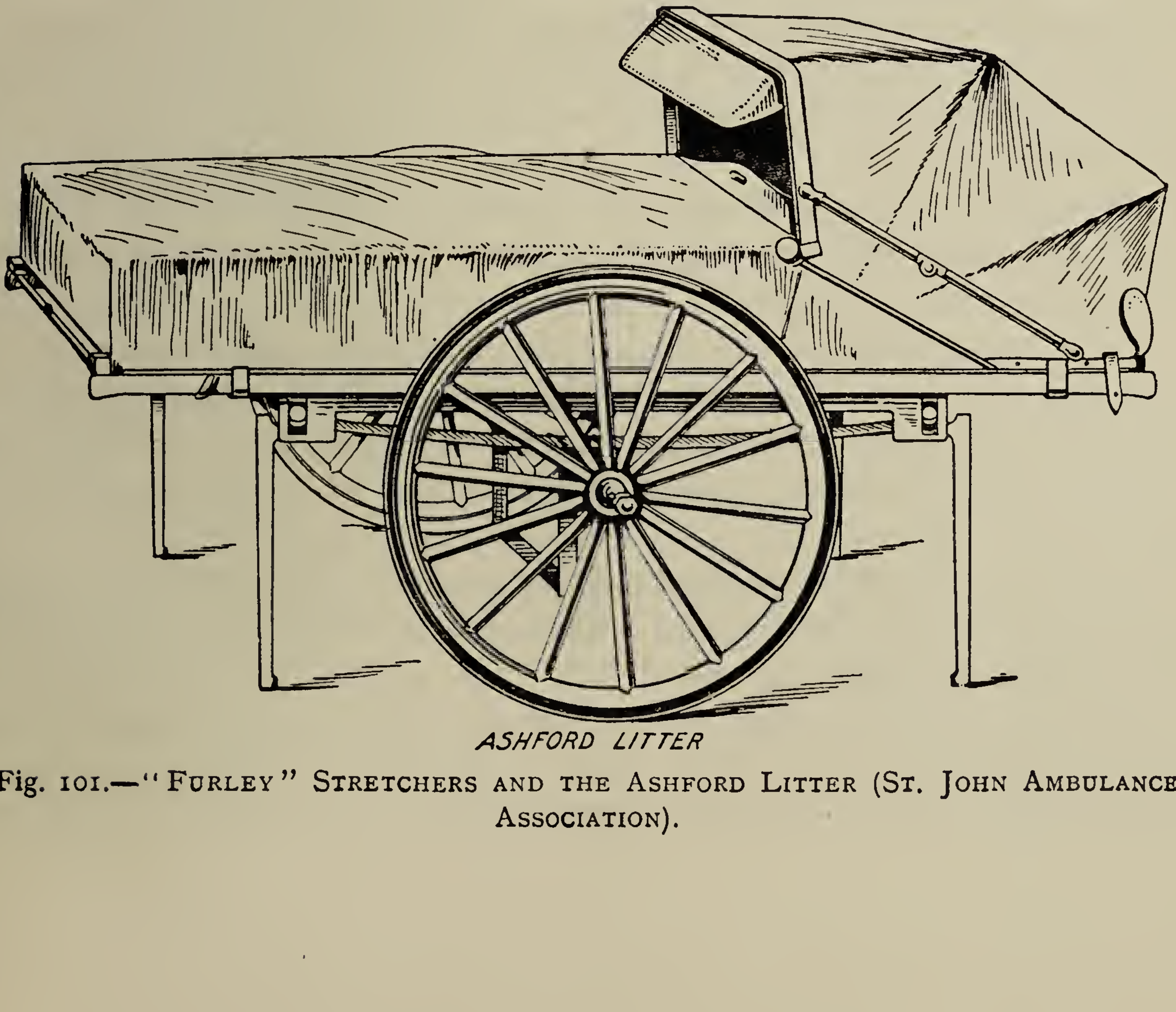
The stretcher is usually carried by slings or broad leather straps, which have at either end a loop that is passed over the handle. One of the loops is provided with a buckle, to enable the sling to be lengthened or shortened as required, and the other end has a transverse strap which is used to fix the stretcher together when it is closed up.



ORDINARY STRETCHER



TELESCOPIC-HANDLED STRETCHER



ASHFORD LITTER

Fig. 101.—"Furley" Stretchers and the Ashford Litter (St. John Ambulance Association).

To open a stretcher and prepare it for use, the transverse straps must be unbuckled, the poles separated with a jerk, and the traverses straightened—with care, otherwise the fingers may be nipped. The slings are then doubled in half and laid over the handles, one at each end.

To close stretchers, the bearers kneel down, remove the slings, fold up the traverses, raise the canvas, and push the poles together. They next stand up, place the handles between their thighs, and roll the canvas tightly round the poles. Each then hands the buckle end of his sling to the other bearer, threads the transverse strap through the loop of the other sling, and buckles it tightly round the closed stretcher.

In carrying a loaded stretcher the sling is placed over the shoulders, well below the collar of the coat behind and in the hollow of the shoulders in front.

POSITION OF PATIENT ON STRETCHER

Special attention should be paid to the injured part and the character of the accident, for these must be a guide as to the position in which the patient should be placed, so that the injury be not increased. As a rule, the head should be kept low and thrown back, so that it may not press upon the chest and windpipe and impede the breathing.

When the *head* is wounded the patient is to be laid rather towards the opposite side, so that the wound may not come into contact with the stretcher.

When the *leg* is fractured the patient should lie over towards the injured side with the limb against the stretcher, as it will thus receive more support and be less likely to be moved.

If the *arm* be injured the patient should lie on his back or be turned on to his uninjured side, and the wounded limb should be supported in a sling and rest on his body. In this position injury is less likely to occur from pressure against the stretcher or jolting in course of removal.

In wounds of the *chest*, especially if there be difficulty of breathing, the body should be well raised and inclined towards the injured side and the head carefully supported.

If the walls of the *abdomen* are wounded the patient should be laid in such a position as to remove all tendency to drag the wounds open. If these are across the abdomen this is best carried out by laying him on his back with his head and chest well raised and his legs bent up well towards his body. The legs should be supported by a pillow or roll of clothing placed under the knees. If, however, the wound of the abdomen be vertical this position will only tend to make it gape, and the legs then should be laid straight out, and the head and chest placed low.

The rule is to carry patients on stretchers feet foremost. In going up hill, however, the stretcher should be reversed, and the patient carried head first. In cases of fracture of the lower extremity—especially of the thighbone—special rules have to be adopted in going up hill. The patient should be carried feet foremost, and in going down hill head foremost—that is, the head should always be lowest, in order that the weight of the body may not press downwards on the injured limb.

GENERAL RULES FOR CARRYING STRETCHERS

A stretcher, when loaded, should always be carried at the full arm's length. It should never be placed upon the shoulders, for it is important that the patient should be seen by the bearers. Such a position is, moreover, fraught with danger, for if one of the bearers were to slip or stumble, great injury might be done to the patient, and his wound seriously aggravated. The tallest bearer should carry the head of the stretcher, for the head should never be lower than the feet. In raising the stretcher, the bearer at the foot end should be careful never to raise it until he feels that the bearer at the head has commenced to do so. The strongest bearer should carry the head end, as he will have to bear the chief weight. The taller and stronger bearer should be at the *lower* end in going up or down hill.

The stretcher should always be carried as level as possible, and in passing over uneven ground this is managed by raising and lowering the end as may be found necessary. This can only be done well by practice, and amateurs are likely to cause the injured person a good deal of distress when carrying him up and down hill.

In carrying a stretcher the bearers should march in time but with opposite feet, the bearer at the head stepping off with his right foot, the one at the feet with his left. The knee must not be kept stiff in marching, but slightly bent, and the feet should be kept close to the ground and not raised as in ordinary walking. In this way the patient will be carried more easily, and with less shaking. On no account should the bearers run whilst carrying a loaded stretcher.

Lifting a loaded stretcher, especially with a helpless patient, over a wall or high fence is always a dangerous proceeding, and should be avoided if possible. It is far better to go some distance out of the direct course in order to find a gate or opening. If this is impossible the wall or fence should be broken down so as to make a passage. If, however, the stretcher *must* be lifted over the wall it should be carried out by the St. John Ambulance Association method described elsewhere (p. 367). The same remarks apply to crossing a ditch. If it *must* be crossed, the Association method should be followed (p. 367).

LITTERS

A litter is another method of transporting an injured person. It consists of an ordinary stretcher placed upon a wheeled under-carriage, and is often provided with a waterproof covering made of mackintosh or canvas. The Ashford litter (Fig. 101, p. 349) is such a vehicle and is used by the St. John Ambulance Association. It is so arranged that when it is being moved the legs of the under-carriage can be raised and used as handles by which to propel it. When at rest the legs can be lowered and render the litter secure. The wheels are so arranged that the bearers can pass between the wheels with the stretcher, and thus avoid the effort of lifting it over them.

The stretcher is kept in position on the under-carriage by the rollers or wheels of the stretcher, which fit into slots. In using a litter it is necessary to lift the stretcher off the wheels and place it on the ground before raising the patient on to it. It is never advisable to lift the patient directly from the ground on to the litter.

The "Rea-Edwards" litter is of somewhat different design. The wheels are made lower, so that it is easy to lift a loaded stretcher over them.

Hand ambulances with wheels are provided by the authorities in many towns in case of street accidents, and are kept at the police stations or in special shelter-boxes, together with other apparatus which may be required, such as splints, bandages, and antiseptic dressings. Stretchers and all necessary appliances for rendering first aid to the injured may be obtained from the British Red Cross Society (9 Victoria Street, London, W.), or from the St. John Ambulance Association.

Motor or horse ambulances may also be obtained in many towns for the removal of sick or injured persons to hospitals, or from one house to another. In London these are supplied by the St. John Ambulance Association, St. John's Gate, Clerkenwell, or by the Metropolitan Asylums Board from any of their ambulance stations. The charges made include the services of driver and attendant. The Metropolitan Asylums Board also supply, free of charge, ambulances for the removal of infectious cases to hospital.

CHAPTER LXXIII

STRETCHER EXERCISES

Exercise for Four Bearers—Exercise for Three Bearers—Alternative Exercise for Three Bearers—Exercise for Use in Mines and Narrow Cuttings—To Cross a Ditch—To Cross a Wall—To Load and Unload a Waggon

EXERCISE NO. I

FOR FOUR BEARERS

THE following stretcher exercises, originally drawn up by Sir John Furley, and revised in 1904 to accord with the drills adopted by the Royal Army Medical Corps, are, by kind permission of the St. John Ambulance Association, taken from the Association's handbook, entitled "First Aid to the Injured," and the illustrations also are modelled upon those in that volume.*

1. THE instructor selects the bearers and numbers them—1, 2, 3, and 4, at his discretion. Should one man be stronger and taller than the others he should be styled No. 3, as he will have to bear the heavier part of the burden. (Bearers should, however, be taught to take any of the positions named in the following exercises, whether that of No. 1, 2, 3, or 4 bearer.)

2. "**Fall In.**"

At the words "Fall in," Nos. 1, 2, and 3 take position on the left side of and facing the patient. No. 1 places himself at the patient's knees, No. 2 at the hips, No. 3 at the shoulders. At the same time No. 4 places the prepared stretcher on the ground by the right side of the patient about two paces away from him, and then takes position opposite to and facing No. 2.

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* "First Aid to the Injured." By James Cantlie, M.A., M.B., F.R.C.S.

3. **"Ready."**

The bearers kneel down on the left knee and take hold of the patient, No. 1 passing his hands and forearms beneath the patient's legs, hands wide apart. Nos. 2 and 4 pass their hands and forearms beneath the patient's hips and loins, and grasp each other's hands. No. 3 passes his left hand across the patient's chest and under the right shoulder, and his right hand beneath the left shoulder.

4. **"Lift."**

On the word "Lift," the bearers raise the patient gently and rest him on the knees of Nos. 1, 2, and 3 bearers; as soon as he is securely rested, No. 4 disengages hands with No. 2, runs round by the head of the stretcher, and places it under the patient, close to the other bearers' feet, being careful that the pillow is immediately under the patient's head (Fig. 102); he then kneels down and locks his hands with those of No. 2 (Fig. 103).

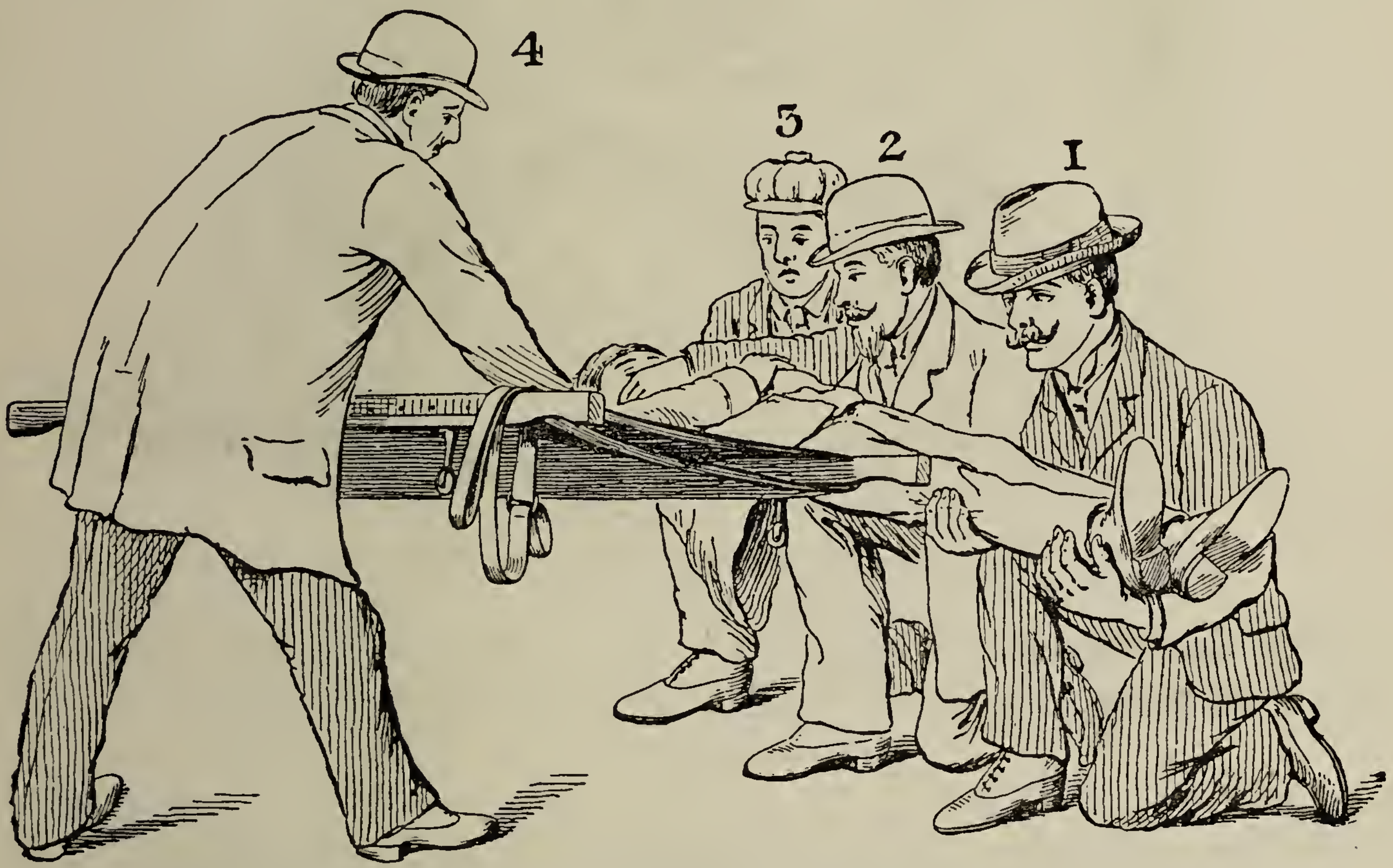

Fig. 102.—The Patient Raised to the Knees of Nos. 1, 2, 3.

5. **"Lower."**

The bearers place the patient on the stretcher (Fig. 104), disengage their hands, and then stand up.

6. "**Stand to Stretcher.**"

No. 1 goes to the foot of the stretcher, with his back to the patient; No. 3 to the head, with his face to the patient; Nos. 2 and 4 remain on each side of the stretcher.

7. "**Ready.**"

Nos. 1 and 3 place the slings, if used, over their shoulders, stoop down, and slip the loops of the slings on to the handles of the stretcher, which they then grasp. As soon as all is right the word is given—

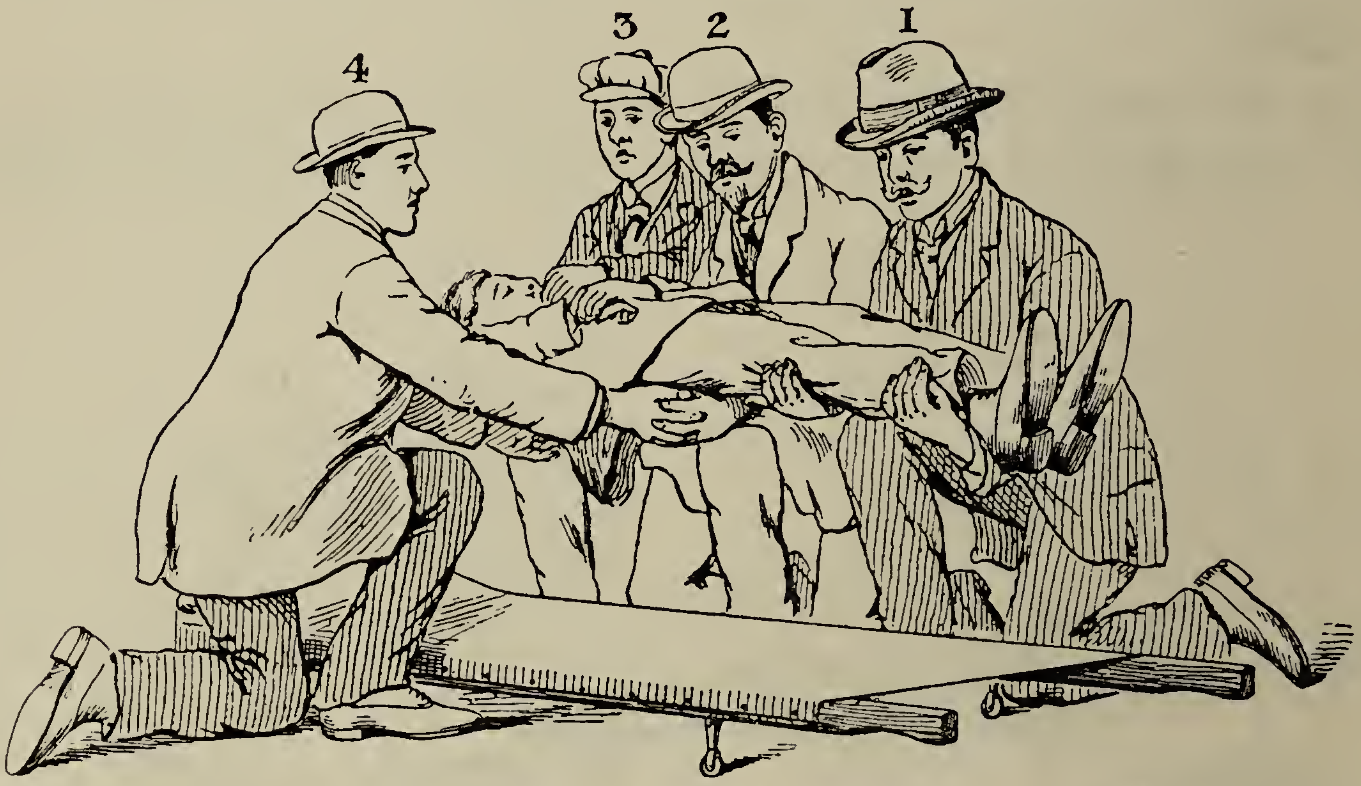

Fig. 103.—No. 4 Locks Hands with No. 2.

8. "**Lift.**"

At the word, Nos. 1 and 3 bearers raise the stretcher steadily together and stand up.

(*Note.*—Nos. 2 and 4 will now adjust the slings on the shoulders of Nos. 1 and 3, taking care that each is well below the level of the collar and lies accurately in the hollow of the shoulder in front. They will also lengthen or shorten the slings, having regard to the patient's injuries and the relative heights of the bearers.)

9. "**March.**"

The bearers move off, Nos. 1, 2, and 4 stepping off with their left foot, and No. 3 with his right foot (Fig. 105). The step should be a short one of 20 inches, and taken with bent knees. There should be no spring from the fore part of the foot.

10. **"Halt."**

The destination being reached, on the word "Halt" being given the bearers remain steady in position.

11. **"Lower."**

At this order the bearers place the stretcher gently on the ground, slip the loops of the slings off the handles of the stretcher, remove the slings from the shoulders, and then stand up, care being taken to let the patient's feet reach the ground before his head.

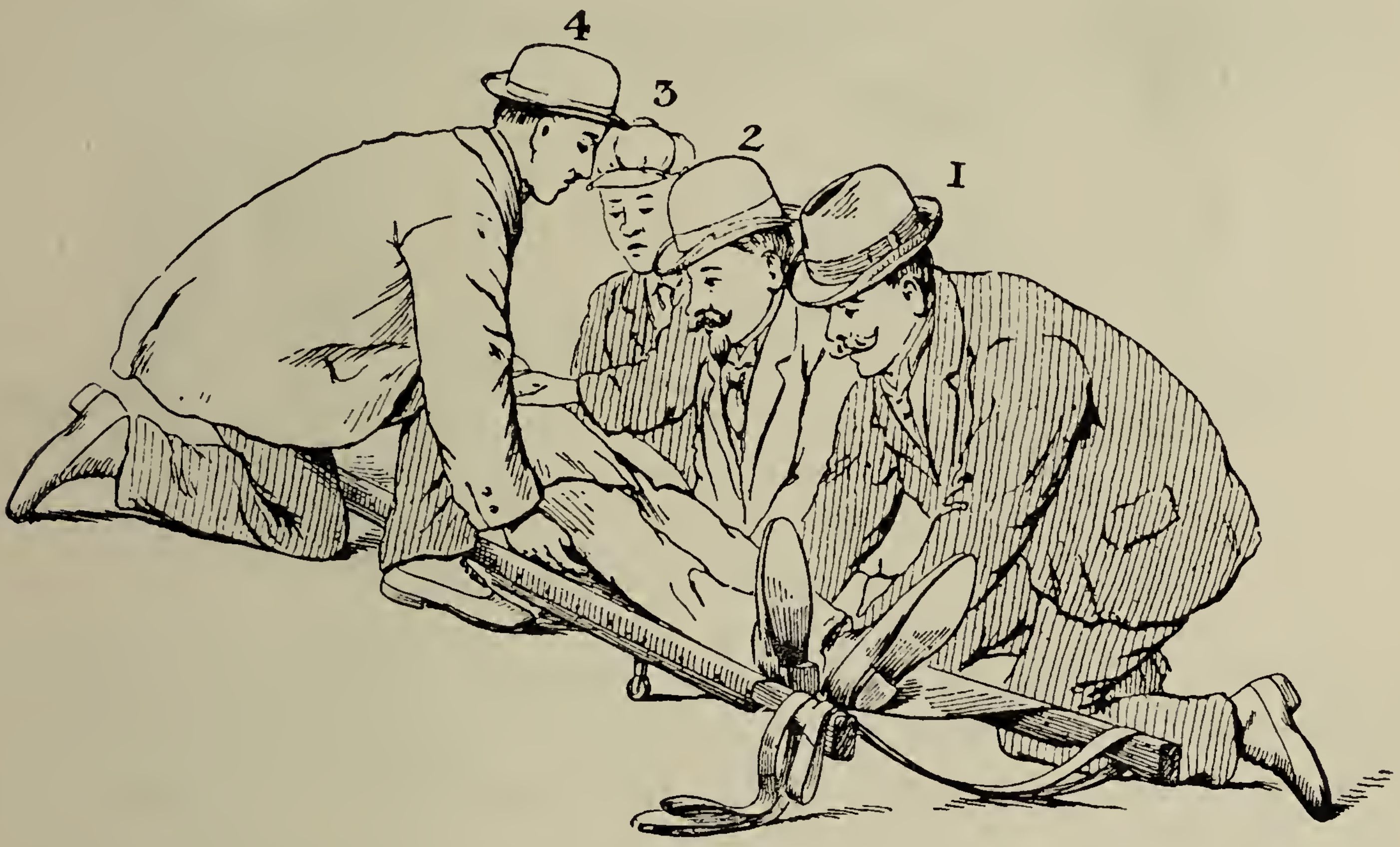

Fig. 104.—Putting the Patient on the Stretcher.

12. **"Unload Stretcher—Ready."**

The bearers prepare to take the patient off the stretcher, as at orders 2 and 3.

13. **"Lift."**

The bearers raise the patient as at order 4 (Fig. 103); No. 4 in this case disengages hands from No. 2, removes the stretcher (Fig. 102),

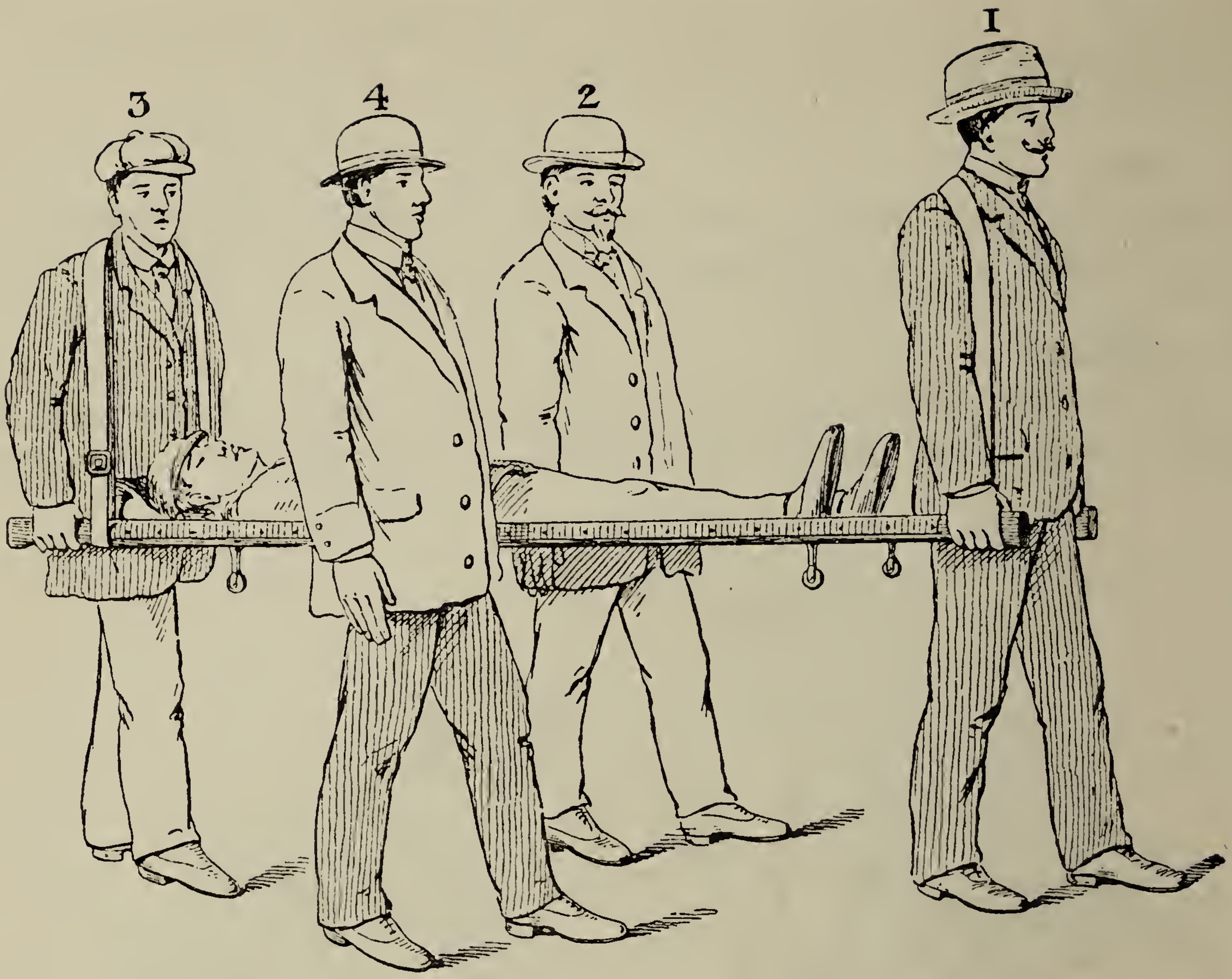

Fig. 105.—Carrying the Patient.

and resumes his former position. If necessary, the bearers will then steadily rise together and carefully carry the patient to the vehicle, bed, or other place to which it has been arranged to convey him.

14. **"Lower."**
The patient is carefully lowered.

EXERCISE NO. II

FOR THREE BEARERS

1. Number the bearers 1, 2, 3.

All orders will be given by No. 2, who will look after the injured part of the patient's body or limbs, to see that no bandages or splints become displaced, and also that No. 1 bearer, in lifting or carrying the stretcher, does not touch the patient's feet.

2. **"Place the Stretcher."**

No. 1 taking the foot of the stretcher, and No. 3 the head, place it in a line with the patient's body, the foot of the stretcher being close to his head.

3. **"Fall In."**

No. 1 places himself on the left side of the patient in a line with his knees, No. 2 on the left side just below the patient's shoulders, and No. 3 at the right side, and faces No. 2.

4. **"Ready."**

All kneel on the left knee. No. 1 places his hands, well apart, underneath the lower limbs, always taking care, in case of a fracture, to have one hand on each side of the seat of injury; Nos. 2 and 3 grasp each other's hands under the shoulders and thighs of the patient (Fig. 106).

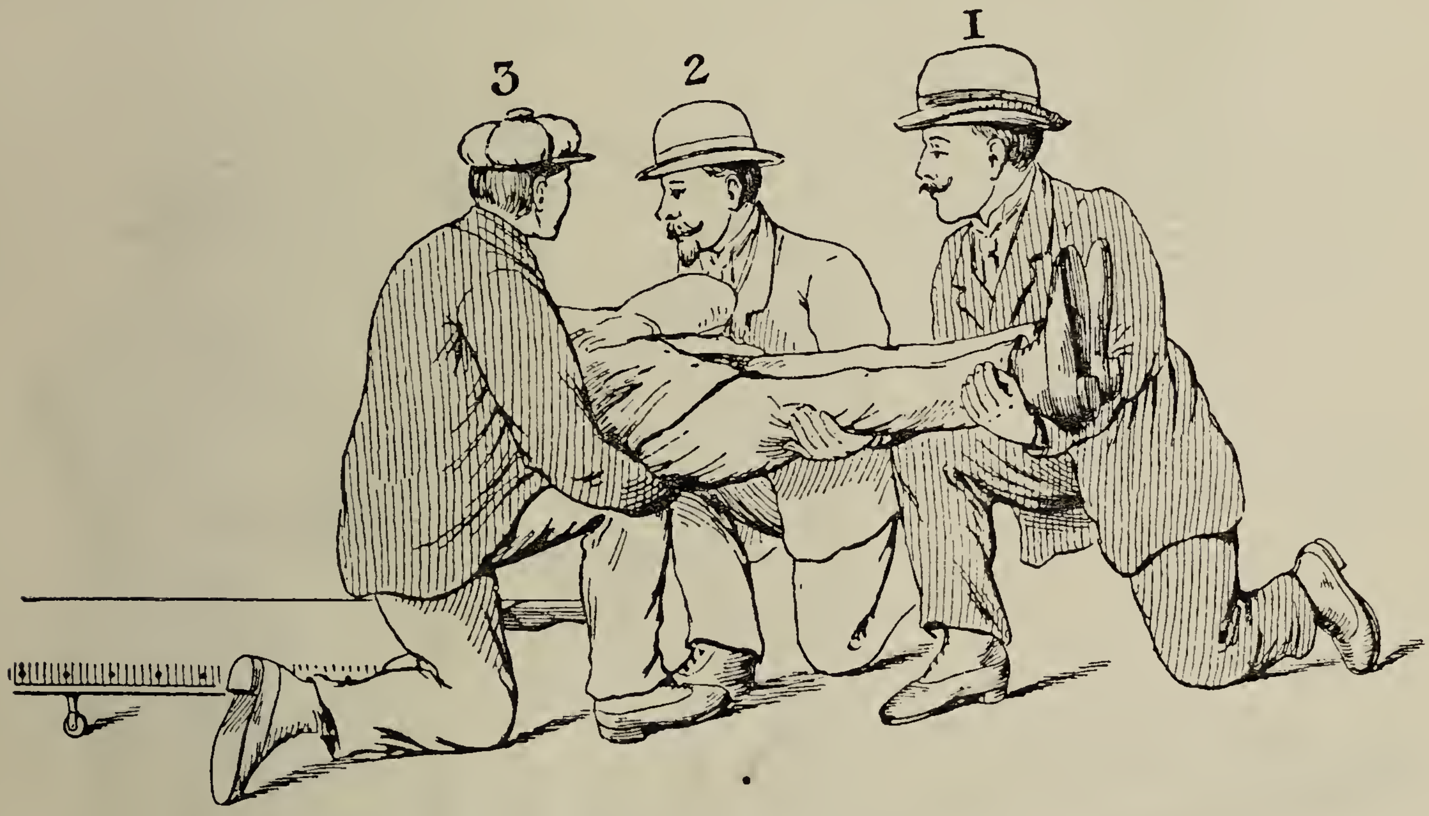

Fig. 106.—PREPARING TO RAISE THE PATIENT.

5. **"Lift."**

All three bearers rise together to their feet, keeping the patient in a horizontal position (Fig. 107).

6. "**March.**"

All take short side paces, carrying the patient over the stretcher until his head is immediately above the pillow.

7. "**Halt.**"

All three bearers remain steady.

8. "**Lower.**"

The bearers stoop down, gently place the patient on the stretcher, disengage their hands, and then stand up.

9. "**Fall In.**"

On this order being given, No. 1 places himself at the foot of the stretcher with his back to the patient, No. 2 places himself at the left side of the patient, and No. 3 at the head, with his face towards the patient.

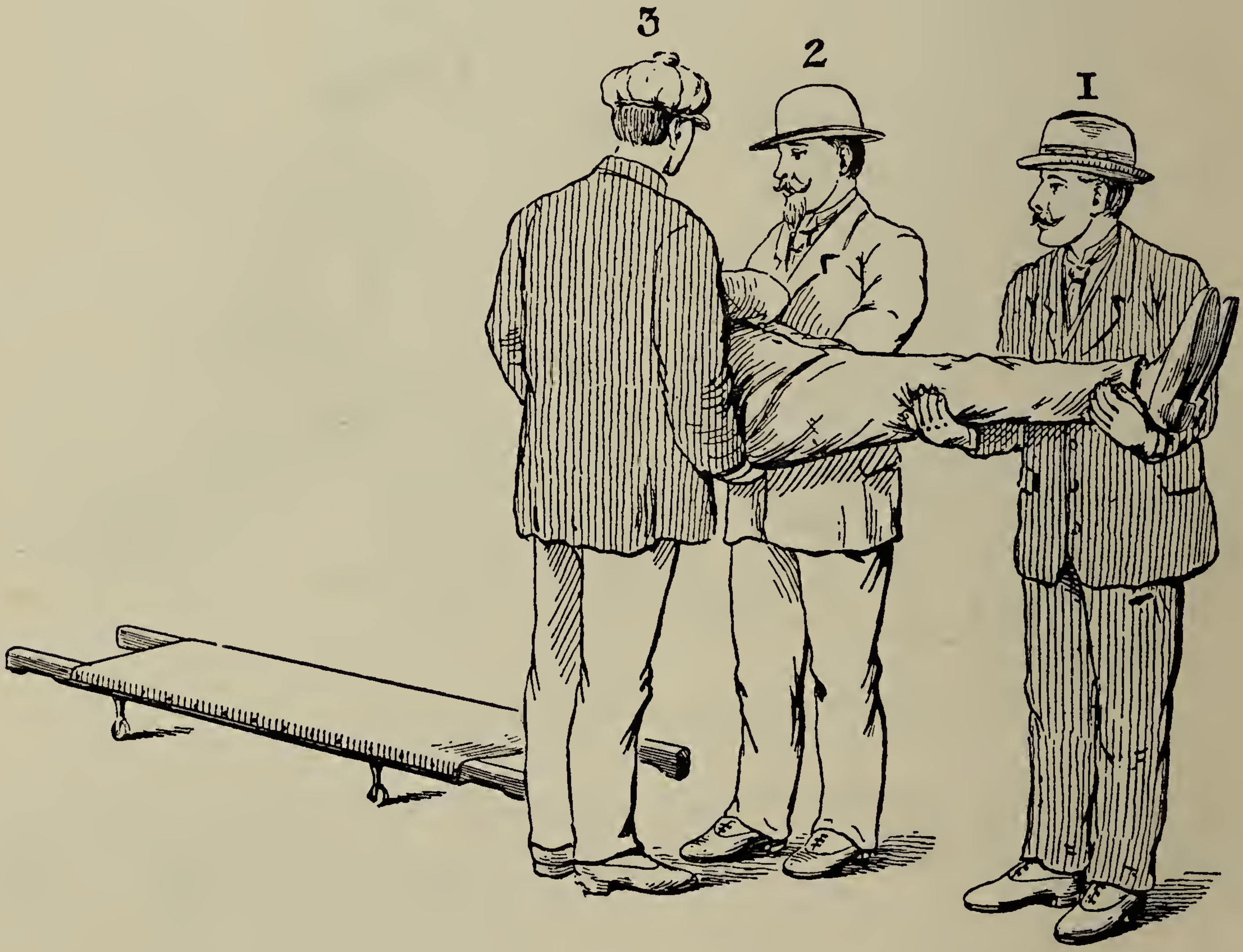

Fig. 107.—The Patient Raised.

10. **"Ready."**

Nos. 1 and 3 place the slings (if used) over their shoulders, stoop down, and slip the loops of the slings on to the handles of the stretcher, which they then grasp.

As soon as all is right the word is given—

11. **"Lift."**

At this word, Nos. 1 and 3 bearers raise the stretcher steadily together and stand up.

(No. 2 will now adjust the slings on the shoulders of Nos. 1 and 3, taking care that each is well below the level of the collar, and lies accurately in the hollow of the shoulder in front. He will also lengthen or shorten the slings, having regard to the patient's injuries and the relative heights of the bearers.)

12. **"March."**

On this word being given, Nos. 1 and 2 step off with the left foot, and No. 3 with the right. The step should be a short one of 20 inches, and taken with bent knees. There should be no spring from the fore part of the foot.

13. **"Halt."**

The destination being reached, on the word "halt" the bearers remain steady in position.

14. **"Lower."**

The bearers place the stretcher gently on the ground, slip the loops of the slings off the handles of the stretchers, remove the slings from the shoulders, and then stand up; care being taken to let the patient's feet reach the ground before his head.

15. **"Unload Stretcher—Ready."**

The bearers prepare to take the patient off the stretcher, as at orders 3 and 4 (Fig. 106).

16. **"Lift."**

The bearers raise the patient as at order 5, and carry him by short side steps, clear of the stretcher, to the vehicle, bed, or other place to which it has been arranged to convey him (Fig. 107).

17. "**Lower.**"

The patient is carefully lowered.

EXERCISE NO. III

WHEN ONLY THREE BEARERS ARE AVAILABLE, AND THE STRETCHER CANNOT BE PLACED AS IN EXERCISE II

1. The instructor numbers the bearers 1, 2, 3. All orders will be given by No. 2.

2. "**Place the Stretcher.**"

No. 1 taking the foot of the stretcher, and No. 3 the head, place it on the ground by the side of the patient and as close to him as practicable.

3. "**Fall In.**"

The three bearers take the same positions on one side of the patient as laid down in Exercise I.

4. "**Ready.**"

Nos. 1, 2, and 3 kneel down on the left knee, placing themselves as close to the patient as they conveniently can, and then take hold of him as directed in Exercise II.

5. "**Lift.**"

Nos. 1, 2, and 3 raise the patient as directed in Exercise I., and then move in a kneeling position up to the stretcher (Fig. 108).

6. "**Lower.**"

The bearers bend forward, carefully lower the patient on to the stretcher, and disengage hands.

7. "**Stand to Stretcher.**"

At this direction all the bearers stand up; No. 1 goes to the foot, No. 2 remains in position at the side, and No. 3 goes to the head of the stretcher.

8. "**Ready.**"

Nos. 1 and 3 place the slings (if used) over their shoulders, stoop down, and slip the loops of the slings on to the handles of the stretcher which they then grasp.

9. "**Lift.**"

Nos. 1 and 3 bearers raise the stretcher steadily together and stand up.

(No. 2 will now adjust the slings on the shoulders of Nos. 1 and 3, taking care that each is well below the level of the collar, and lies accurately in the hollow of the shoulder in front. He will also lengthen or shorten the slings, having regard to the patient's injuries and the relative heights of the bearers.)

10. "**March.**"

Nos. 1 and 2 step off with the left foot, and No. 3 with the right. The step should be a short one of 20 inches, and taken with bent knees. There should be no spring from the fore part of the foot.

11. "**Halt.**"

The destination being reached, on the word "Halt" the bearers remain steady in position.

12. "**Lower.**"

The bearers place the stretcher gently on to the ground, slip the loops of the slings off the handles of the stretcher, remove the slings from the shoulders, and then stand up, care being taken to let the patient's feet reach the ground before his head.

13. "**Unload Stretcher—Ready.**"

No. 1 places himself on the left side of the patient, and in a line with his knees, No. 2 on the left side just below the patient's shoulders, and No. 3 at the right side, and faces No. 2. All kneel on the left knee. No. 1 places his hands, well apart, underneath the lower limbs, always taking care, in case of a fracture, to have one hand on each side of the seat of injury. Nos. 2 and 3 grasp each other's hands under the shoulders and thighs of the patient (compare Fig. 106).

14. "**Lift.**"

The bearers rise together to their feet, keeping the patient in a horizontal position, and carry him by short side steps, clear of the stretcher to the vehicle, bed, or other place to which it has been arranged to convey him (Fig. 107).

15. **"Lower."**
The patient is carefully lowered.

EXERCISE NO. IV

FOR USE IN MINES AND NARROW CUTTINGS WHERE TWO MEN ONLY CAN BE ENGAGED

Nos. 1 and 2 will carefully place the stretcher in a line with the injured man's body, the foot of the stretcher being, if possible, close to his head.

No. 1 straddles across the patient's legs, placing his right foot, with the toe turned outwards, a little below the patient's knees, and with the toe of the left foot touching the heel of No. 2; he then stoops down, passes the left hand under the patient's thighs, and the right hand across and under the patient's calves. No. 2 places his feet one on each side of the patient between his body and arms, the toe of each foot as near the armpits as possible. He then stoops down and passes his hands

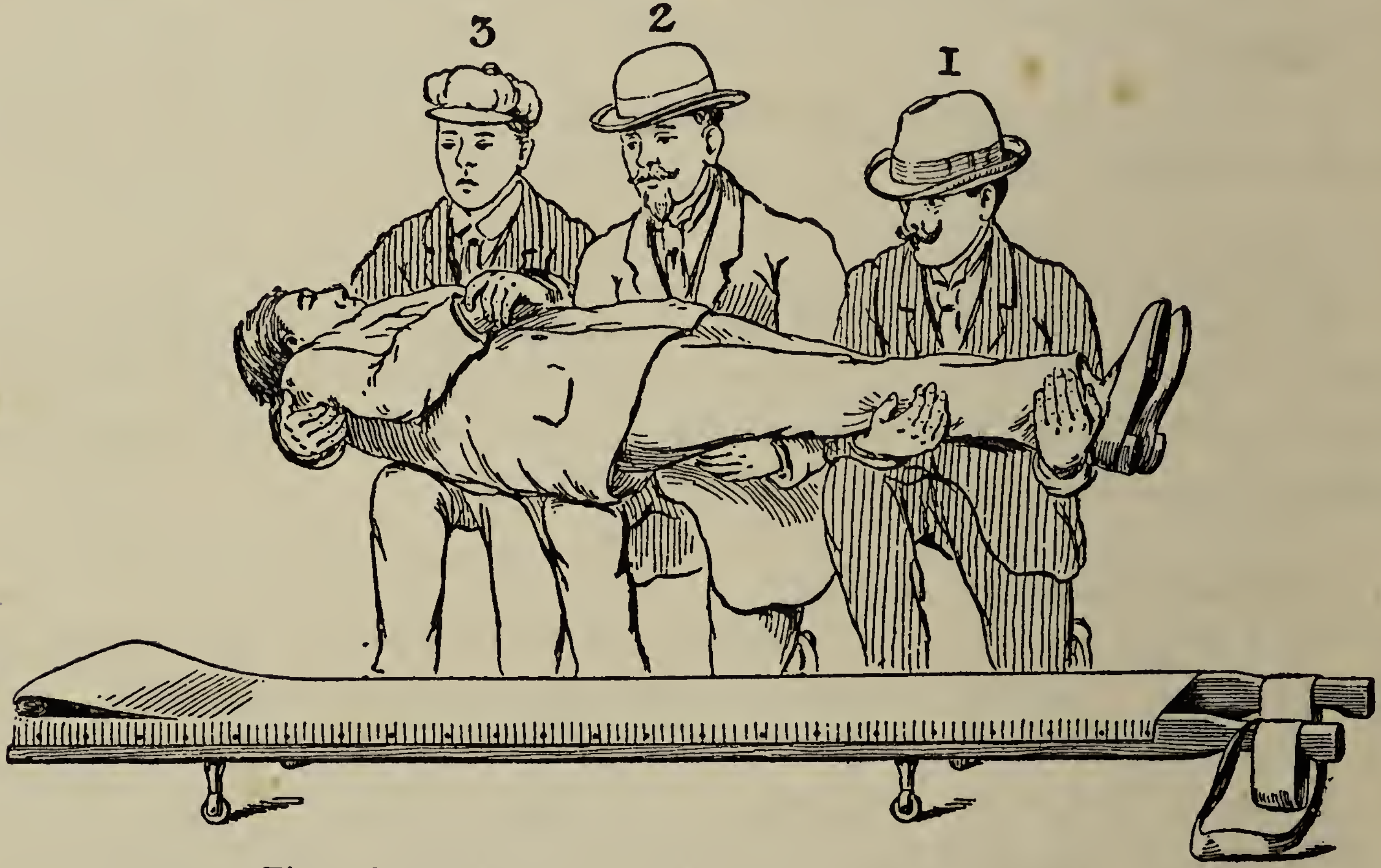

Fig. 108.—Bearing the Patient to the Stretcher.

between the sides of the chest and the arms underneath the shoulders, and locks the fingers (Fig. 109). If the patient's arms be uninjured, he may put them round the neck of No. 2, and by this means greatly assist him in lifting.

When both are ready, No. 1 will give the order "**Lift and Move Forward.**" The patient is then to be slowly lifted, just sufficiently to allow his body to clear the stretcher. Both bearers will slowly and gradually move the patient forward, No. 2 by very short steps, No. 1 by bending his body forward as much as he can without moving his feet (Fig. 110). No. 1 now gives the order "**Halt,**" whereupon No. 2 remains steady, and No. 1 advances his right foot to his left, and again advances his left foot till the toe touches the heel of No. 2. No. 1 then gives the order "**Advance,**" when the patient will again be moved forward. These movements are to be repeated until the patient is over the stretcher, when he is to be gently lowered (Fig. 110).

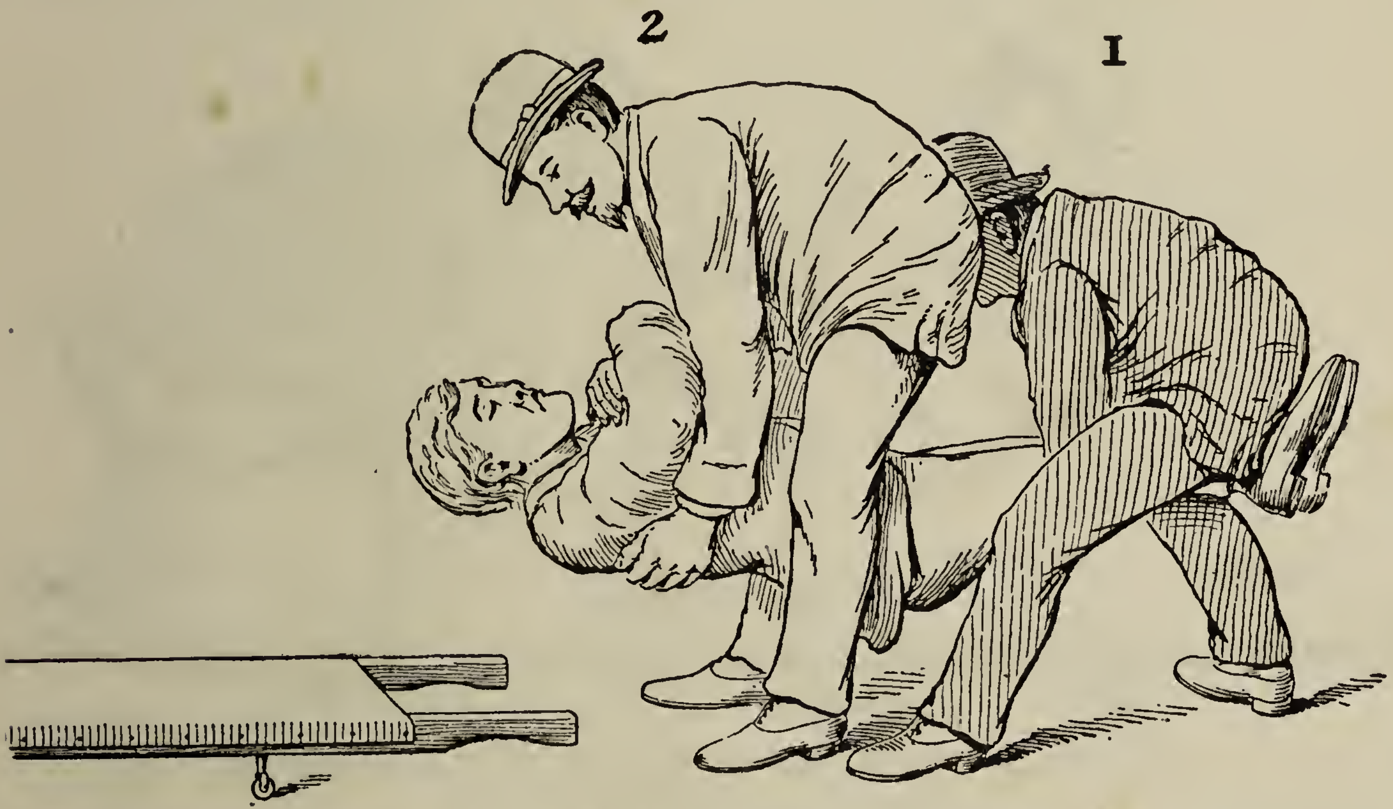

Fig. 109.—Raising the Patient.

The bearers will then act in the ordinary manner, as far as the nature of the locality will permit.

TO CROSS A DITCH

In crossing a broad ditch (Fig. 111), the stretcher should be lowered to the ground, its foot one pace from the edge of the ditch. Nos. 1 and 2 descend. The stretcher, with the patient upon it, is afterwards advanced, Nos. 1 and 2 bearers in the ditch supporting the front end of the stretcher, while its other end rests on the edge of the ground above. While the stretcher is thus supported, No. 3 descends. All the bearers now carry the stretcher to the opposite side, and the foot of the stretcher is made to rest on the edge of the ground, while the head is supported by No. 3 in the ditch. No. 1 climbs out, No. 2 remaining in the ditch to assist No. 3. The stretcher is lifted forward on to the ground above, and rests there while Nos. 2 and 3 climb up. Nos. 1 and 3 then resume the carriage of the stretcher.

In crossing a narrow ditch the preceding must be somewhat modified (*see* Fig. 112). Place the stretcher on the ground within a pace of the edge of the ditch and with the foot towards it; bearers Nos. 1 and 2 get into the ditch, and all lift the stretcher together until its two ends can rest on the opposite banks. No. 1 then gets out of the ditch on the farther side and takes the foot of the stretcher, whilst the two bearers in the ditch carry the head, and thus it is lifted across it on to the other side. The bearers then take their proper places, raise the stretcher, and proceed on their march.

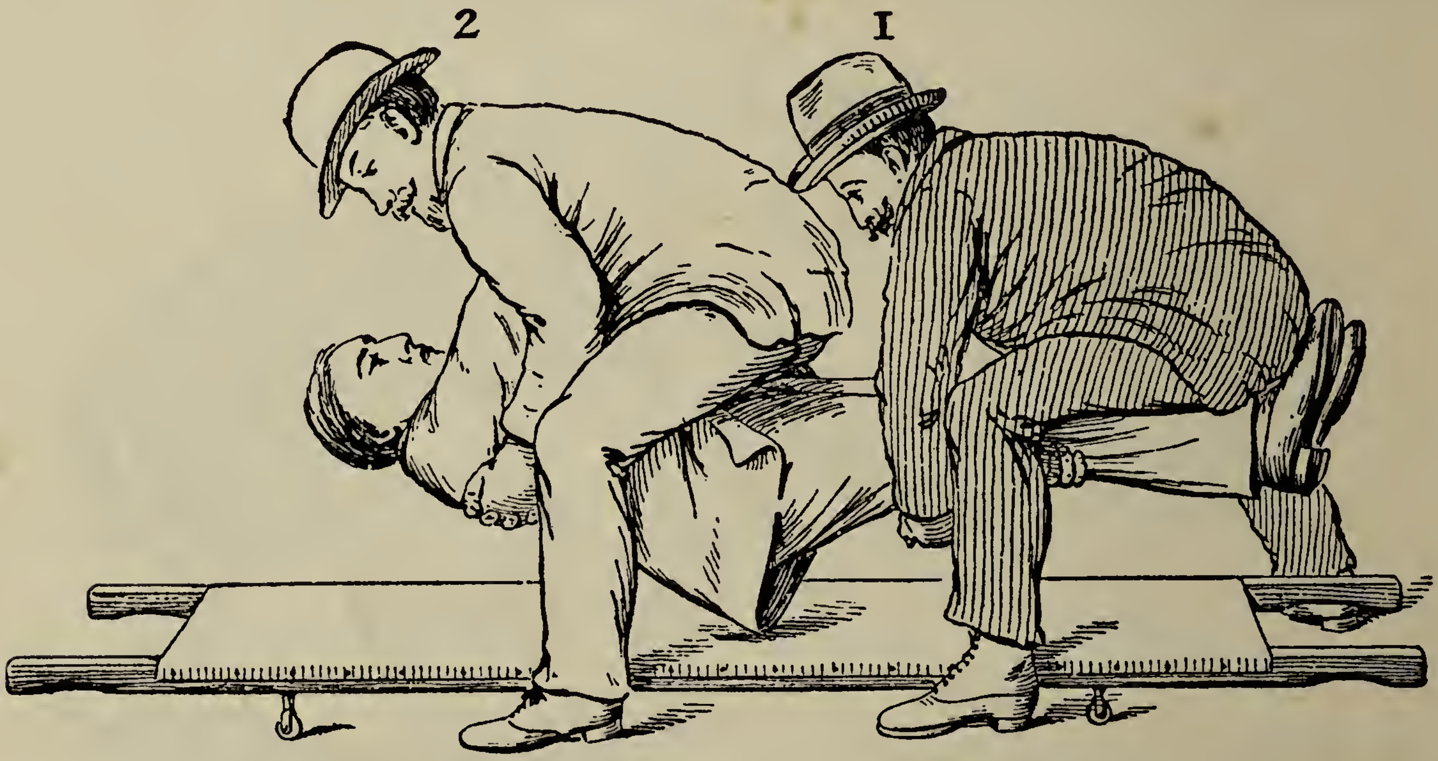

Fig. 110.—Lowering the Patient on to the Stretcher.

TO CROSS A WALL

The stretcher is lowered with the foot about one pace from the wall. Nos. 1 and 2 bearers then take hold of the foot of the stretcher and No. 3

of the head; the stretcher is raised till the foot is placed on the wall. No. 1 then climbs over the wall and takes hold of the foot of the stretcher, while Nos. 2 and 3 support the head; the stretcher is then carried forward till the head rests on the wall, No. 1 supporting the foot. Nos. 2 and 3 then climb over the wall and take hold of the head of the stretcher, which is slowly lifted off the wall on to the ground, and the bearers take their usual places.

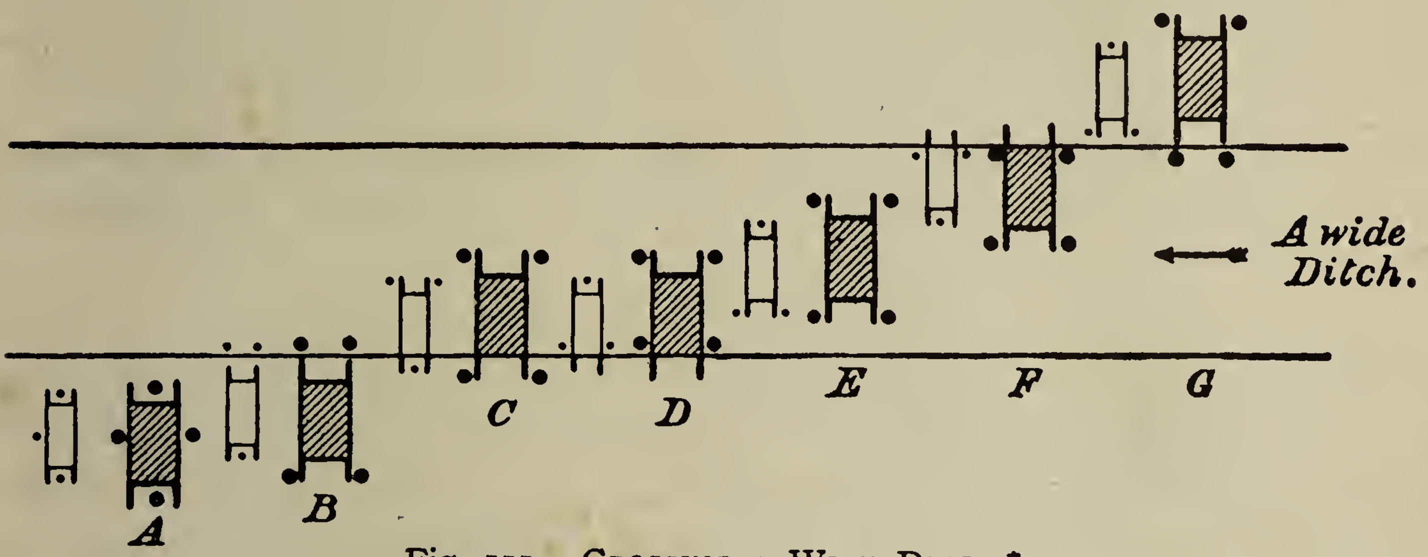

Fig. 111.—Crossing a Wide Ditch.*

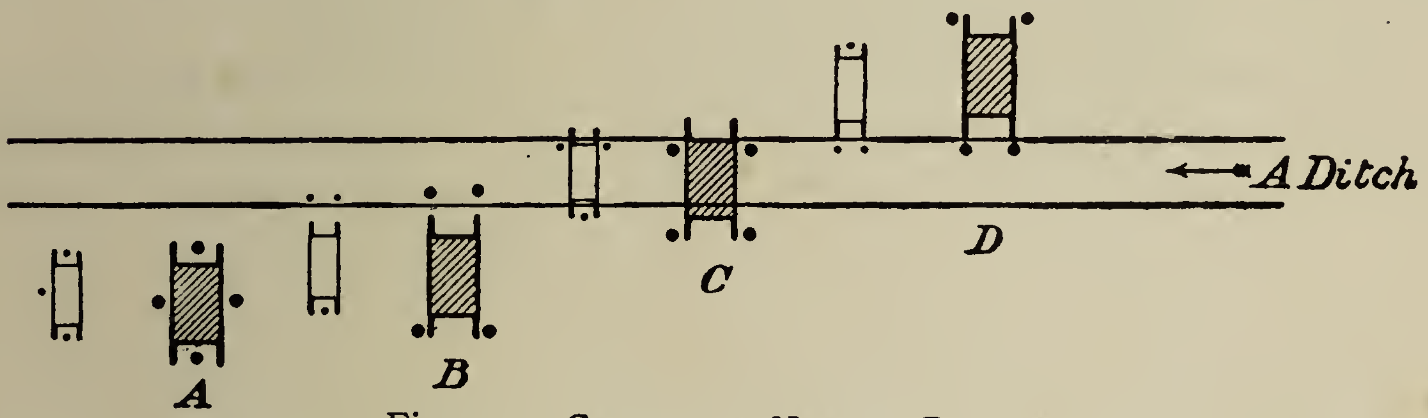

Fig. 112.—Crossing a Narrow Ditch.*

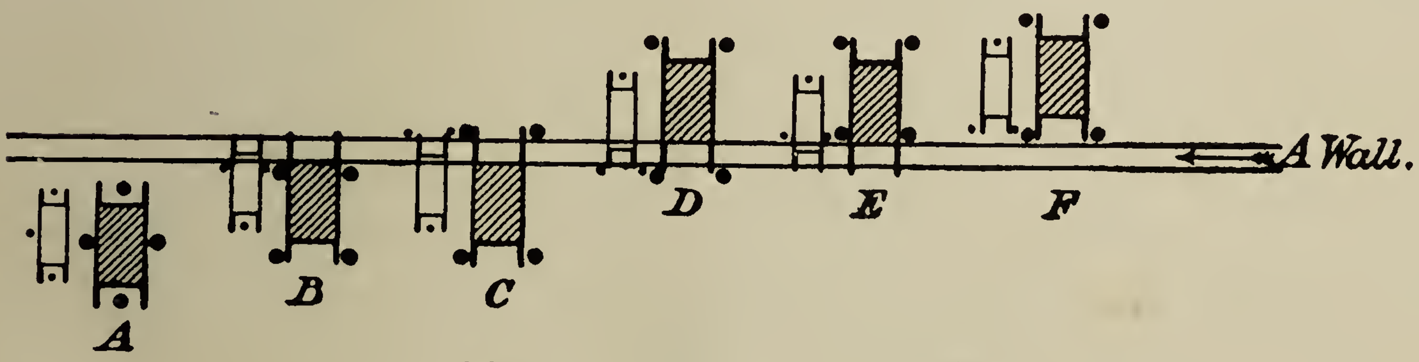

Fig. 113.—Crossing a Wall.*

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* The unshaded stretcher is supposed to be carried by three bearers, as in the text; the shaded by four.

TO LOAD A WAGGON

The stretcher is lowered with the foot one pace from the end of the waggon. Nos. 1 and 2 take hold of the foot of the stretcher, No. 3 the head. The stretcher is then raised and carried forward till the front wheels rest on the floor of the waggon. No. 1 then jumps into the waggon, while No. 2 goes to the head of the stretcher and helps No. 3. The stretcher is then pushed slowly into the waggon. If the tailboard cannot be shut, the stretcher must be lashed firmly to the sides of the waggon.

TO UNLOAD A WAGGON

Nos. 2 and 3 take hold of the head of the stretcher, while No. 1 gets into the waggon ; the stretcher is then gradually drawn out till the foot wheels rest on the edge of the waggon. No. 1 jumps out of the waggon and with No. 2 takes hold of the foot of the stretcher, No. 3 supporting the head. The stretcher is then gently drawn away one pace and lowered. The bearers then fall in in their usual places.

When four bearers are attending to the patient, Nos. 1 and 2 would lift the foot of the stretcher, while Nos. 3 and 4 lift the head. This applies to crossing a ditch or wall, as well as to loading and unloading a waggon.

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